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August 28, 1992

VIA MESSENGER AND MAIL

Ms. Karen Martin (P-19J)
Community Relations Coordinator
United States Environmental Protection Agency
77 West Jackson
Chicago, Illinois 60604

Re: Comments to Proposed Plan for Remedial Action
American Chemical Service Superfund Site
Griffith, Indiana, June 1992
Our File #10007-63001

Dear Ms. Martin:

We are writing on behalf of the ACS RD/RA Organizational Group, comprised of certain entities identified by U.S. EPA as potentially responsible parties ("PRPs") to the American Chemical Service ("ACS") CERCLA Site to supplement the technical comments presented by Warzyn, Inc. for the PRPs. A list of these PRPs is attached hereto as Exhibit A. These supplemental comments will address five issues regarding the Proposed Plan for Remedial Action submitted for public comment by the U.S. Environmental Protection Agency ("U.S. EPA") in June of 1992. First, the PRPs object to any ROD which issues with specified clean up standards, particularly "health-based standards," where U.S. EPA does not first propose specific standards for review and comment. Second, the PRPs object to U.S. EPA's selection of clean up standards unrelated to the capabilities of the technology selected for remediation at the Site. Third, the PRPs disagree with U.S. EPA's position that a Land Disposal Restriction treatability variance is inappropriate at the Site. Fourth, the Administrative Record, and therefore the decision based on the Record, is deficient in that the Record does not contain any evidence of required state ARARs. Specifically, Indiana currently has in effect a ban on PCB incineration, yet U.S. EPA appears to ignore this ban. Fifth, U.S. EPA incorrectly rejected the Ecological Assessment prepared by the Respondents to the Administrative Order on Consent ("Consent Order") under which the RI/FS was prepared (the "Respondents") and all documents bearing on that decision must be included in the Administrative Record.

SELECTION OF CLEAN UP STANDARDS AND APPLICABILITY OF LDR AND LDR TREATABILITY VARIANCE STANDARDS

U.S. EPA's Preferred Remedy 6B mandates low temperature thermal treatment ("LTTT") of buried wastes in the off-site area; LTTT of soils in both the on-site and off-site areas contaminated with PCBs at levels greater than 10 ppm; and LTTT of any VOC-contaminated soil not treated by in-situ vapor extraction. The Preferred Remedy also states that "All LTTT residuals will be deposited back into the excavations after meeting appropriate health-based levels. U.S. EPA has determined that LDR [Land Disposal Restrictions] treatability variance standards are not protective for redeposited soils." See Proposed Plan for Remedial Action at 21-22. These "appropriate health-based levels", however, are not disclosed in the Proposed Remedy.

The concept of "health-based" treatment levels encompasses a wide range of possible chemical concentrations. Depending upon a number of variables -- including the dilution attenuation factor and exposure pathways -- a "health-based" approach to setting concentration levels may yield levels orders of magnitude apart. See generally, 57 Fed. Reg. 21,450 (May 20, 1992). The PRPs object to U.S. EPA's issuance of a proposed plan which does not identify the supposed health-based standards which U.S. EPA has stated orally to our consultants are still being developed and will be included in the ROD. This process deprives the PRPs of their statutory right to comment on a critical aspect of the proposed plan.

The PRPs also object to U.S. EPA's proposed plan specifying specific remedial technologies where the "health-based" standards are not related to whether the technology selected can achieve the as yet unspecified clean up standards. Some "health-based" standards may be achievable by a certain technology (such as LTTT), and some may not be. For U.S. EPA to require LTTT without specifying the exact "health-based" number, along with a technical justification, is arbitrary and capricious because it ignores the limitations inherent in any treatment technology and creates doubt whether any one technology will achieve the standard.

Though U.S. EPA is silent on the specific health-based standard, it suggests that such standards are below the applicable LDR levels, which are technology-based. This approach raises a further question: since the LDR standards are based upon the "Best Demonstrated Available Technology," how can U.S. EPA set a treatment level below BDAT without proof that this "better-than-best" technology will meet the new standard? These concerns indicate that U.S. EPA is getting ahead of itself.

U.S. EPA, without any legal basis, completely disregards the applicability of both the LDR and LDR treatability variance standards established by its own guidance. As an initial matter, U.S. EPA, in its proposed plan, seems to suggest that contaminated soil at the ACS Site is subject to LDRs, i.e., the contaminated soil must be treated to at least BDAT levels. If this were not the case, there would be no need for a LDR treatability variance. If this is U.S. EPA's position respecting the soils at the ACS Site, that position is inconsistent with Superfund LDR Guide #5, "Determining When Land Disposal Restrictions (LDRs) Are Applicable to CERCLA Response Actions" (July 1989), attached as Exhibit B. According to LDR Guide #5, if contaminated soil is treated in place or within the "area of contamination" from which it was excavated, the LDR standards do not apply. LDRs apply only to contaminated soils that are excavated and placed elsewhere, rather than being returned to the same or a different "area of contamination." An "area of contamination" is defined as an area of contiguous contamination that must be continuous, but may contain various types and concentrations of hazardous substances. As such, LDR restrictions do not apply at the ACS Site, where treated soils will be returned to the same area of contamination.

Second, if soil is not returned to the area of contamination, a treatability variance is appropriate under applicable guidance. U.S. EPA recognizes that treatment of contaminated soil to the LDR standards typically is not possible or appropriate because Superfund wastes differ significantly from the wastes used to set the LDR treatment standards. In such cases, U.S. EPA's policy is to provide a treatability variance. See Superfund LDR Guide #6A (2nd Edition) "Obtaining a Soil and Debris Treatability Variance for Remedial Actions" (September 1990), attached as Exhibit

C. Nothing in the Administrative Record supports U.S. EPA's conclusion here that a treatability variance at the ACS Site is unavailable or not "protective."[1/]

Presumably, U.S. EPA policy dictates that a treatability variance issue for contaminated soil precisely because the otherwise applicable LDR standards are either inappropriate or not cost-effective. Or, put another way, they are too low. Thus, as is true under U.S. EPA's "HWIR" proposal, the health-based clean up standards for soil are almost all above the applicable LDR standard. See Hazardous Waste Identification Rule (HWIR), 57 Fed. Reg. 21450, 21510-13 (May 20, 1992). The PRPs are particularly concerned with U.S. EPA's positions on soil and debris at the ACS Site because we fear the as yet undetermined health-based standards ignore recent U.S. EPA promulgated and announced directives. U.S. EPA recently promulgated its rule regarding treatment for debris contaminated by hazardous waste. 57 Fed. Reg. 37194 (August 18, 1992). In developing the rule, U.S. EPA acknowledges that contaminated debris should not be treated the same as other hazardous wastes because debris encompasses a wholly different set of matrixes. With the rule, U.S. EPA establishes treatment methods tailored to contaminated debris.

1/ In reviewing the documents in U.S. EPA's Administrative Record, the only document discussing the availability of the LDR treatability variance is Document No. 173, where the State of Indiana states a treatability variance may be applied for but queries whether the waste could be returned to the same excavation unless the excavation met the minimum technology requirements for landfills, 40 C.F.R. § 265.301. This is a red-herring. U.S. EPA has previously determined that return of treated soils to the excavation does not constitute deposit into a new landfill unit and as such § 265.301 is not applicable. See CERCLA Compliance with Other Laws Manual, Ch. 2. U.S. EPA apparently also reached this conclusion because the proposed remedy does not specify that the requirements of § 265.301 must be met before treated soils are returned to the excavation.

Further, U.S. EPA has indicated that it will propose a similar rule for soil contaminated with hazardous substances in September or October 1992 -- as early as next week. See 57 Fed. Reg. 21450, 21465 (May 20, 1992). In the advanced notice of proposed rule making for soil, U.S. EPA indicates that it will be pursuing a new treatment strategy for soil. This strategy will rely upon alternative treatment technologies, as well as the "contained-in" interpretation, to reduce the current technical and administrative burdens in treating contaminated soil. 56 Fed. Reg. at 55,172-73. U.S. EPA has also proposed soil clean-up levels in its recent HWIR rule-making proposal. HWIR, 57 Fed. Reg. at 21463-67. This U.S. EPA directive, too, has been ignored by Region V in its Proposed Plan for the ACS Site. Region V should incorporate U.S. EPA's most recent approach to addressing contaminated soil and debris into the Record of Decision for the Site.

We understand that U.S. EPA is committed to issuing the ACS Site ROD before September 30, 1992 in order to claim credit for another ROD on Fiscal Year 1992 to meet program goals. The PRPs object to issuance of a ROD before September 30, 1992 merely to obtain another bean in U.S. EPA's count if there are important countervailing considerations. Here U.S. EPA's entire approach to contaminated soil is in a state of flux, with imminent pronouncement of new directions due. Similarly, U.S. EPA's approach to risk assessment is undergoing dramatic change. Last February, U.S. EPA's Deputy Administrator, Hank Habicht, issued a memorandum on risk characterization directing that risk assessments evaluate central tendency exposure levels -- the risk posed to the average person. This is a significant departure from the current "reasonable maximum exposure" method. The U.S. EPA is now proceeding to develop guidance on central risk tendency exposure assessments.

Indeed, the entire foundations of risk assessment analysis are being re-examined by the U.S. Department of Health whose verdicts on determining whether particular substances are carcinogenic are the basis for U.S. EPA's regulatory action. In a July 13, 1992 pronouncement, 57 Fed. Reg. 31721, the Advisory Review Report by the National Toxicology Program's Board of Scientific Counselors is set forth. The Report states: "[I]t should be noted that approximately two-thirds of the NTP carcinogens would not

be . . . considered as carcinogens, if the MTD [maximum tolerated dose] was not used. The implicit assumptions underlying extrapolation from the MTD . . . do not appear to be valid." Id. at 31723.

Use of MTD has been the basis of far-reaching regulatory actions costing the U.S. economy billions of dollars. At the ACS Site, U.S. EPA ought to delay issuance of the ROD to allow time for U.S. EPA to finalize its announced directions respecting contaminated soils and risk assessment, rather than rushing a ROD to press merely to meet this year's ROD quota, and in the process perhaps selecting a remedy which costs tens of millions of dollars more than that which might be appropriate based on U.S. EPA's forthcoming approach.

ADMINISTRATIVE RECORD

Certain documents, outlined further below and in the technical comments presented by Warzyn, are properly part of the Administrative Record for this matter. The general policy of U.S. EPA is to be inclusive in the Administrative Record. As set forth in the Final Guidance on Administrative Records for Selecting CERCLA Response Actions (OSWER Directive No. 9833.3A-1; attached as Exhibit D), the Administrative Record is intended to provide a basis for the selection of the response action (Admin. Guidance, page 1). Any judicial review of a chosen remedy will be based solely on the Record (Administrative Guidance, pages 1, 3). Further, the Record must serve as a vehicle for public participation (Admin. Guidance, pages 1, 4). Specifically, documents must be included in the Administrative Record which demonstrate the public's opportunity to participate and comment on the Record (Admin. Guidance, page 22). This includes data submitted by PRPs (page 24) as "public", defined in the guidance, includes PRPs (Admin. Guidance, page 3). The Record must include documents which were considered by U.S. EPA in proposing a remedy, even if such documents were ultimately rejected (Admin. Guidance, page 2).

The Administrative Record is required to include information regarding ARARs (Admin. Guidance, page 24). This is uniquely relevant in this matter, because there are no documents in the Administrative Record to suggest that the

State of Indiana submitted any ARARs, as required by the NCP. Pursuant to Section 121 of CERCLA and Sections 300.515(d)(1) and 300.515(h)(2) of the NCP (40 C.F.R. §§ 300.515(d)(1) and (h)(2)), the state "shall" identify ARARs and communicate them to the lead agency in a timely manner in order to have them incorporated in the remedy. The ARARs "must" be communicated by the State within 30 days of a request from the lead agency. Here, U.S. EPA issued its request for State ARARs on April 30, 1991 (Admin. Record Index No. 130). No state response appears in the Record. The problem with this lack of state ARARs is that Indiana currently has in effect a statute which bans the incineration of PCBs in the State. (Indiana Code Annotated § 13-7-16.5-9, attached as Exhibit E.) Yet the U.S. EPA proposed remedy incorporates the incineration of PCBs, without reference to the Indiana PCB statute, which is an "applicable" standard, and, therefore, an ARAR.

At the time U.S. EPA requested ARARs from the State, Indiana wholly supported a remedy which did not include incineration. The State of Indiana approved Alternative 5 from the Feasibility Study (Admin. Record Index No. 173), which is the remedy propounded by the ACS PRPs. As there was no incineration included in the remedy approved by the State, the PCB incineration bar was not an issue. It was only when U.S. EPA chose a form of Alternative 6B as a remedy that this issue arose. Although U.S. EPA stated in the public meeting in Griffith, Indiana that the State of Indiana supports the proposed remedy issued in June of 1992, there is no document in the Administrative Record to support this fact. (Admin. Guidance, page 25; "record must include state's position on the proposed remedy".)

ECOLOGICAL ASSESSMENT

An additional issue which has been totally neglected in the Administrative Record concerns the Ecological Assessment ("EA"). Despite the fact that the Respondents submitted an EA consistent with the Consent Order and the NCP, U.S. EPA rejected the EA and issued its own version. All the documents reflecting this decision must be included in the Record. A summary of the relevant events follows.

Warzyn submitted its first draft Baseline Risk Assessment and Ecological Assessment on January 31, 1991. A copy of the draft EA is attached as Exhibit F. The Ecological Assessment (Section 7.2) was patterned after several ecological assessments which had recently been approved by U.S. EPA's Region V. U.S. EPA sent its review comments on the first draft on April 24, 1991. (Admin. Record Index Nos. 127, 128). U.S. EPA required major increases in the scope of the EA, although no new U.S. EPA guidance had yet been promulgated. On June 26, 1991 the PRPs' contractor, Warzyn, sent U.S. EPA a list of agreed assumptions on which the revised EA was to be based (Admin. Record No. 144). Then on June 28, 1991, Warzyn corresponded again with U.S. EPA to memorialize U.S. EPA's approval of the assumptions. (Admin. Record No. 145). U.S. EPA issued correspondence dated July 1, 1991 also summarizing what it believed to be the EA assumptions, while reserving rights to further re-evaluate the adequacy of the assumptions. (Admin. Record No. 146). Warzyn submitted a revised EA on behalf of the PRPs on July 2, 1991. A copy of the revised EA is attached as Exhibit G. Despite the changes in the second draft, on August 9, 1991 U.S. EPA listed 25 additional comments to the second draft EA. (Admin. Record No. 152). Finally, on October 8, 1991 Warzyn, on behalf of the PRPs, submitted the third and final draft Ecological Assessment to U.S. EPA incorporating many of U.S. EPA's requested changes. A copy of the third draft EA is attached hereto as Exhibit H.

Rather than providing additional comments to the PRPs' EA, U.S. EPA opted to create its own version. (Admin. Record. No. 187). On April 20, 1992 the ACS PRPs sent a letter to U.S. EPA taking issue with U.S. EPA's position and reserving the PRPs' rights to assert that the PRPs' version of the EA fully met requirements of the Consent Order and the National Contingency Plan. A copy of the April 20, 1992 letter is attached as Exhibit I. The ACS PRPs still assert that their EA as issued in October of 1992 was in compliance with all requirements under the Consent Order and the NCP and should be used for further decision making regarding remediation at the ACS Site.

Although the Administrative Record does not necessarily include drafts of reports, the drafts of the ACS PRPs' EA are properly part of the Administrative Record. As an initial matter, U.S. EPA's preliminary comments on each

draft report are included in the record and the draft comments should logically be included as well. Moreover, the EA drafts were clearly the basis for U.S. EPA's decision to issue its own EA. Where draft documents are the basis for a response decision or explain how decisions are made, they are to be included in the Administrative Record (Admin. Guidance, page 34).

Based on the above guidance, the ACS PRPs specifically request that all documents attached to and cited in the PRPs' comments prepared by Warzyn and in these comments be included in the Administrative Record.

Thank you for your attention to these matters.

Very truly yours,

Andrew H. Perellis, On Behalf of
the ACS RD/RA Organizational Group
and its members, as identified in
Exhibit A

AHP:cc

Enclosures

cc: All Participants to the ACS
RD/RA Organizational Agreement

Exhibit A

AMERICAN CHEMICAL SERVICE CO., INC.
GRIFFITH, INDIANA CERCLA SITE

#	PARTICIPANT	PRP NAME
1	Abbott Laboratories	Abbott Laboratories
2	Acme Metals Incorporated	Acme Steel Company
3	Allied-Signal Inc.	Allied Chemical Corp.
		Baron Blakeslee, Inc.
		Printing Plate Supply
		Woodstock Die Casting
4	Amerace Corporation	Emconite/Stimsonite
5	American Chemical Service Co., Inc.	American Chemical Service Co., Inc.
6	American National Can Company	American National Can Company
		Guardian Packaging Corporation
7	American Roller Company	American Roller Company
8	Ashland Chemical, Inc.	Ashland Chemical, Inc.
9	Ashland Petroleum Company	Ashland Oil (Big Ben)
10	Atlas Electric Devices Company	Atlas Electric Devices Company
11	Avery Dennison	G. J. Aigner Co.
12	Bagcraft Corporation of America	Bagcraft Corporation of America
13	Bagcraft Corporation of America	Bagcraft Corporation of America
14	Baxter Healthcare Corporation	Hamilton Industries
15	Beatrice	Fiberite
		Hi-Temp
		Muter
16	Bemis Company, Inc.	Lustour Corporation
17	Bemis Manufacturing Company	Bemis Manufacturing Company
18	Borden, Inc.	Borden, Inc.

EXHIBIT

A

19	Borg-Warner Corporation	Marbon Chemical
		Spring Division
20	BP America Inc.	Hauley Products
21	The Budd Company	The Budd Company
22	Candoc	Cudner & O'Connor
23	Champion International	Central Wax Paper
24	Chapco	Chicago Adhesive Products
25	Chevron Corporation	Kewanee Industries (Fermco Laboratories /Nutrasweet)
26	Chicago Finished Metals	Chicago Finished Metals
27	Chicago Loop Auto Refinishing	Chicago Loop Auto Refinishing
28	The Coca-Cola Company	The Coca-Cola Company
29	Continental White Cap	Continental Can Co.
30	Cook Composites and Polymers	Freeman Chemical
31	Cooper Industries, Inc.	Belden Manufacturing
32	CSX Transportation, Inc.	CSX Transportation, Inc.
33	CTS Corporation	CTS Microelectronics
34	Daubert Industries, Inc.	Daubert Chemical
35	DeMert & Dougherty, Inc.	DeMert & Dougherty, Inc.
36	The Dexter Corporation	Dexter-Midland
37	Dietzgen Corporation	Eugene Dietzgen
38	R. R. Donnelley & Sons Company	R. R. Donnelley & Sons Company
39	The Dow Chemical Company	The Dow Chemical Company
		J. W. Mortell (The Mortell Company)
40	E. I. du Pont de Nemours and Company	E. I. du Pont de Nemours and Company
41	Federal Paper Board Company, Inc.	Federal Paper Board Company, Inc.

42	Flint Ink Corporation	Sinclair and Valentine
43	The Flintkote Company	The Flintkote Company
44	Fort Dearborn Litho	Fort Dearborn Litho
45	Gast Manufacturing Corporation	Gast Manufacturing Corporation
46	GATX	General American Transportation Corporation
47	GCA	Precision Scientific
48	GenCorp Inc.	General Tire & Rubber Company
49	General Motors Corporation	General Motors Corporation
50		
51	Glidden Co.	Glidden Co.
		Glidden-Durkee
		Gliden-Nubian
52	Graham Paint & Varnish	Graham Paint & Varnish
53	Great Lakes Terminal & Transport Corporation	Great Lakes Terminal & Transport Corporation
54	Grow Group, Inc.	Martin Varnish
55	The C. P. Hall Co.	The C. P. Hall Co.
56	Handschy Industries	St. Clair Manufaturing Corp.
57	Hydrite Chemical Co.	North Central Chemicals
58	Hydrosol, Inc.	Hydrosol, Inc.
59	IB Distributors, Inc.	Illinois Bronze Paint
60	ICI Specialty Inks	Thiele Engdahl
61	IMCERA	Mallinckordt, Inc.
62	Industrial Coatings Group, Inc.	Joanna Western Mills Co.
63	INX International Ink Co.	Acme Printing Ink Company
		Packaging Inks
64	ITT Corporation	ITT H. M. Harper Division

65	James River Paper Co., Inc.	Kalamazoo Vegetable
		H. P. Smith
66	Johnson Matthey Inc.	Breve Corporation (formerly Meyercord Co.)
67	Johnson & Johnson	J. T. Clark Co.
68	S. C. Johnson & Son, Inc.	S. C. Johnson & Son
		S. C. Johnson Wax Co.
		Johnson Wax Co.
69	Kalmus and Associates, Inc.	Kalmus and Associates, Inc.
70	KNS Companies Inc.	KNS Companies Inc.
71	Krueger Ringier	Chicago RotoPrint
72	LCKCO. Inc.	Advertising Metal Display Industries, Inc.
73	Eli Lilly and Company	Eli Lilly and Company
74	The Lockformer Company	The Lockformer Company
75	Mallinckrodt, Inc.	Mallinckrodt, Inc.
76	Martin Marietta Corporation	Martin Marietta Corporation
77	Matthews Paint Company	Matthews Paint Company
78	Maxus Energy Corporation	Occidental Chemical Corp. (formerly Diamond Shamrock)
79	The Mead Corporation	The Mead Corporation
80	Memphis Environmental Center, Inc.	Velsicol Chemical Corporation
81	Methode Electronics, Inc.	Methode Electronics, Inc.
82	Midwest Sintered Products Corporation	Midwest Sintered Products Corporation
83		
84	Milton Bradley Company	Playskool, Inc.
85	Minnesota Mining and Manufacturing Company	Minnesota Mining and Manufacturing Company
86	Mobil Oil Corporation	American Marietta

		Mobil Chemical
		Mobil Finishes
		Mobil Oil Corporation
		Superior Oil
87	Montgomery Ward & Co., Incorporated	Montgomery Ward & Co., Incorporated
		Standard T Chemical Company, Inc.
88	Morton International, Inc.	Adcote Chemical
		Bee Chemical
		Morton Chemical
89	Motorola Inc.	Motorola Inc.
90	G. J. Nikolas & Co., Inc.	G. J. Nikolas & Co., Inc.
91	The O'Brien Corporation	The O'Brien Corporation
92	Owens Corning Fiberglas	Owens Corning Fiberglas
93	Packaging Corporation of America	Ekco Products Inc.
94	Packard Instrument Co.	Packard/Canberra
95	Parisian Novelty Company	Parisian Novelty Company
96	Phillips and Martin	Phillips and Martin
97	Plicon Corporation	Packaging Laminators
98	PPG Industries, Inc.	Houston Chemicals
		Pittsburgh Plate Glass
99	Pratt & Lambert, Inc.	Pierce and Stevens Corp.
100	Precision Brand Products, Inc.	DuPage Manufacturing
101	Premier Industries	Premier Paint and Varnish
102	Primerica Holdings, Inc.	American Can Company
103	Reichhold Chemicals, Inc.	Reichhold Chemicals, Inc.
104	Reliable Paste & Chemical Co.	Reliable Paste & Chemical Co.
105	Reliance Electric Company	Chicago Thrift Etching Corporation
106	Rogers Carriage Company	Rogers Carriage Company

107	Rollprint Packaging	Rollprint Packaging
108	Rust-Oleum Corp.	Rust-Oleum Corp.
109	Safety Kleen Envirosystems Company	Inland Chemical Corporation
		McKesson Envirosystems Company
110	G. D. Searle & Co.	Searle Chemicals Inc.
111	The Sherwin-Williams Company	The Sherwin-Williams Company
112	SmithKline Beecham Pharmaceuticals	DAP, Inc./Inland Coatings/Master Bronze
		(Note: see USG)
113	Roy Strom Refuse Removal Service, Inc.	Roy Strom Refuse Removal Service, Inc.
114	Stuart Industrial Coatings, Inc.	Stuart Paint
115	T. L. Swint Industries, Inc.	J. A. Gits Corp.
116	Technical Products, Inc.	Technical Petroleum
117	TeePak, Inc.	TeePak, Inc.
118	Teledyne Post	Frederick Post
119	Texaco Inc.	Texaco Inc.
		Chemplex Company
120	Tingstol Co.	Tingstol Co.
121	Trinova	J. P. Gits Molding
		Sterling Engineered Products Inc.
122	Union Carbide Corporation	Haynes
		London Chemical
		Union Carbide Linde
		Union Carbide Visking
123	Union Oil/Unocal	W. H. Barber Chemical Co.
124	Union Tank Car Company	Lilhcote Company
125	United Technologies Corporation	Amos Molded Products/United Technologies Automotiv
		Dryden Rubber Co./Sheller Globe Corporation
		Interchemical Corporation/Inmont Corporation
126	USG Corporation	LaMirada/DAP, Inc./Inland Coatings/Master Bronze
		(Note: see SmithKline Beecham)

127	USX Corporation	U. S. Steel
128	The Valspar Corporation	The Valspar Corporation
129	Vitamins, Inc.	Vitamins, Inc.
130	Vulcan Corporation	Vulcan Corporation
131	Walbro Corporation	Auburn Diecast Corp.
132	Whirlpool Corporation	Whirlpool Corporation
133	Whiteco Industries, Inc.	White Advertising Company White Graphics Systems
134	Zenith Electronics Corporation	Zenith Electronics Corporation
	Miles Inc.	Miles Inc.
	Alumax Inc.	Alumax Inc.
	Nordson Corporation	Nordson Corporation
	Arrow Plastic Manufacturing Company	Arrow Plastic Manufacturing Company
	Follett Library Book Company	Follett Corporation
	Central Can Company	Central Can Corporation
	*Illinois Tool Works Inc.	Illinois Tool Works Inc.

Exhibit B

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response | Directive: 9347.3-05FS July 1989

EPA

Superfund LDR Guide #5

Determining When Land Disposal Restrictions (LDRs) Are Applicable to CERCLA Response Actions

CERCLA Section 121(d)(2) specifies that on-site Superfund remedial actions shall attain "other Federal standards, requirements, criteria, limitations, or more stringent State requirements that are determined to be legally applicable or relevant and appropriate (ARAR) to the specified circumstances at the site." In addition, the National Contingency Plan (NCP) requires that on-site removal actions attain ARARs to the extent practicable. Off-site removal and remedial actions must comply with legally applicable requirements. This guide outlines the process used to determine whether the Resource Conservation and Recovery Act (RCRA) land disposal restrictions (LDRs) established under the Hazardous and Solid Waste Amendments (HSWA) are "applicable" to a CERCLA response action. More detailed guidance on Superfund compliance with the LDRs is being prepared by the Office of Solid Waste and Emergency Response (OSWER).

For the LDRs to be applicable to a CERCLA response, the action must constitute placement of a restricted RCRA hazardous waste. Therefore, site managers (OSCs, RPMs) must answer three separate questions to determine if the LDRs are applicable:

(1) Does the response action constitute placement?

(2) Is the CERCLA substance being placed also a RCRA hazardous waste? and if so

(3) Is the RCRA waste restricted under the LDRs?

Site managers also must determine if the CERCLA substances are California list wastes, which are a distinct category of RCRA hazardous wastes restricted under the LDRs (see Superfund LDR Guide #2).

(1) DOES THE RESPONSE CONSTITUTE PLACEMENT?

The LDRs place specific restrictions (e.g., treatment of waste to concentration levels) on RCRA hazardous wastes prior to their placement in land disposal units. Therefore, a key e[illegible]a is whether the response action will constitute placement of wastes into a land disposal unit. As defined by RCRA, land disposal units include landfills, surface impoundments, waste piles, injection wells, land treatment facilities, salt dome formations, underground mines or caves, and concrete bunkers or vaults. If a CERCLA response includes disposal of wastes in any of these types of off-site land disposal units, placement will occur. However, uncontrolled hazardous waste sites often have widespread and dispersed contamination, making the concept of a RCRA unit less useful for actions involving on-site disposal of wastes. Therefore, to assist in defining when "placement" does and does not occur for CERCLA actions involving on-site disposal of wastes, EPA uses the concept of "areas of contamination" (AOCs), which may be viewed as equivalent to RCRA units, for the purposes of LDR applicability determinations.

An AOC is delineated by the areal extent (or boundary) of contiguous contamination. Such contamination must be continuous, but may contain varying types and concentrations of hazardous substances. Depending on site characteristics, one or more AOCs may be delineated. Highlight 1 provides some examples of AOCs.

Highlight 1: EXAMPLES OF AREAS OF CONTAMINATION (AOCs)

- A waste source (e.g., waste pit, landfill, waste pile) and the surrounding contaminated soil.
- A waste source, and the sediments in a stream contaminated by the source, where the contamination is continuous from the source to the sediments.*
- Several lagoons separated only by dikes, where the dikes are contaminated and the lagoons share a common liner.

* The AOC does not include any contaminated surface or ground water that may be associated with the land-based waste source.

EXHIBIT

B

For on-site disposal, placement occurs when wastes are moved from one AOC (or unit) into another AOC (or unit). Placement does not occur when wastes are left in place, or moved within a single AOC. Highlight 2 provides scenarios of when placement does and does not occur, as defined in the proposed NCP. The Agency is current reevaluating the definition of placement prior to the promulgation of the final NCP, and therefore, these scenarios are subject to change.

Highlight 2: PLACEMENT

Placement does occur when wastes are:

- Consolidated from different AOCs into a single AOC;
- Moved outside of an AOC (for treatment or storage, for example) and returned to the same or a different AOC; or
- Excavated from an AOC, placed in a separate unit, such as an incinerator or tank that is within the AOC, and redeposited into the same AOC.

Placement does not occur when wastes are:

- Treated in situ;
- Capped in place;
- Consolidated within the AOC; or
- Processed within the AOC (but not in a separate unit, such as a tank) to improve its structural stability (e.g., for capping or to support heavy machinery).

In summary, if placement on-site or off-site does not occur, the LDRs are not applicable to the Superfund action.

(2) IS THE CERCLA SUBSTANCE A RCRA HAZARDOUS WASTE?

Because a CERCLA response must constitute placement of a restricted RCRA hazardous waste for the LDRs to be applicable, site managers must evaluate whether the contaminants at the CERCLA site are RCRA hazardous wastes. Highlight 3 briefly describes the two types of RCRA hazardous wastes –listed or characteristic wastes.

Highlight 3: RCRA HAZARDOUS WASTES

A RCRA solid waste* is hazardous if it is listed or exhibits a hazardous characteristic.

Listed RCRA Hazardous Wastes

Any waste listed in Subpart D of 40 CFR 261, including:

- F waste codes (Part 261.31)
- K waste codes (Part 261.32)
- P waste codes (Part 261.33(e))
- U waste codes (Part 261.33(f))

Characteristic RCRA Hazardous Wastes

Any waste exhibiting one of the following characteristics, as defined in 40 CFR 261:

- Ignitability
- Corrosivity
- Reactivity
- Extraction Procedure (EP) Toxicity

* A solid waste is any material that is discarded or disposed of (i.e., abandoned, recycled in certain ways, or considered inherently waste-like). The waste may be solid, semi-solid, liquid, or a contained gaseous material. Exclusions from the definition (e.g., domestic sewage sludge) appear in 40 CFR 261.4(a). Exemptions (e.g., household wastes) are found in 40 CFR 261.4(b).

Site managers are not required to presume that a CERCLA hazardous substance is a RCRA hazardous waste unless there is affirmative evidence to support such a finding. Site managers, therefore, should use "reasonable efforts" to determine whether a substance is a RCRA listed or characteristic waste. (Current data collection efforts during CERCLA removal and

remedial site investigations should be sufficient for this purpose.) For listed hazardous wastes, if manifests or labels are not available, this evaluation likely will require fairly specific information about the waste (e.g., source, prior use, process type) that is "reasonably ascertainable" within the scope of a Superfund investigation. Such information may be obtained from facility business records or from an examination of the processes used at the facility. For characteristic wastes, site managers may rely on the results of the tests described in 40 CFR 261.21 - 261.24 for each characteristic or on knowledge of the properties of the substance.' Site managers should work with Regional RCRA staff, Regional Counsel, State RCRA staff, and Superfund enforcement personnel, as appropriate, in making these determinations.

In addition to understanding the two categories of RCRA hazardous wastes, site managers will also need to understand the derived-from rule, the mixture rule, and the contained-in interpretation to identify correctly whether a CERCLA substance is a RCRA hazardous waste. These three principles, as well as an introduction to the RCRA delisting process, are described below.

Derived-from Rule (40 CFR 261.3(c)(2))

The derived-from rule states that any solid waste derived from the treatment, storage, or disposal of a listed RCRA hazardous waste is itself a listed hazardous waste (regardless of the concentration of hazardous constituents). For example, ash and scrubber water from the incineration of a listed waste are hazardous wastes on the basis of the derived-from rule. Solid wastes derived from a characteristic hazardous waste are hazardous wastes only if they exhibit a characteristic.

Mixture Rule (40 CFR 261.3(a)(2))

Under the mixture rule, when any solid waste and a listed hazardous waste are mixed, the entire mixture is a listed hazardous waste. For example, if a generator mixes a drum of listed F006 electroplating waste with a non-hazardous wastewater (wastewaters are solid wastes - see Highlight 3), the entire mixture of the F006 and wastewater is a listed hazardous waste. Mixtures of solid wastes and characteristic hazardous wastes are hazardous only if the mixture exhibits a characteristic.

Contained-in Interpretation (OSW Memorandum dated November 13, 1986)

The contained-in interpretation states that any mixture of a non-solid waste and a RCRA listed hazardous waste must be managed as a hazardous waste as long as the material contains (i.e., is above health-based levels) the listed hazardous waste. For example, if soil or ground water (i.e., both non-solid wastes) contain an F001 spent solvent, that soil or ground water must be managed as a RCRA hazardous waste, as long as it "contains" the F001 spent solvent.

Delisting (40 CFR 260.20 and .22)

To be exempted from the RCRA hazardous waste "system," a listed hazardous waste, a mixture of a listed and solid waste, or a derived-from waste must be delisted (according to 40 CFR 260.20 and .22). Characteristic hazardous wastes never need to be delisted, but can be treated to no longer exhibit the characteristic. A contained-in waste also does not have to be delisted; it only has to "no longer contain" the hazardous waste.

If site managers determine that the hazardous substance(s) at the site is a RCRA hazardous waste(s), they should also determine whether that RCRA waste is a California list waste. California list wastes are a distinct category of RCRA wastes restricted under the LDRs (see Superfund LDR Guide #2).

(3) IS THE RCRA WASTE RESTRICTED UNDER THE LDRs?

If a site manager determines that a CERCLA waste is a RCRA hazardous waste, this waste also must be restricted for the LDRs to be an applicable requirement. A RCRA hazardous waste becomes a restricted waste on its HSWA statutory deadline or sooner if the Agency promulgates a standard before the deadline. Because the LDRs are being phased in over a period of time (see Highlight 4), site managers may need to determine what type of restriction is in

Highlight 4: LDR STATUTORY DEADLINES

Waste	Statutory Deadline
Spent Solvent and Dioxin-Containing Wastes	November 8, 1986
California List Wastes	July 8, 1987
First Third Wastes	August 8, 1988
Spent Solvent, Dioxin-Containing, and California List Soil and Debris From CERCLA/RCRA Corrective Actions	November 8, 1988
Second Third Wastes	June 8, 1989
Third Third Wastes	May 8, 1990
Newly Identified Wastes	Within 6 months of identification as a hazardous waste

effect at the time placement is to occur. For example, if the RCRA hazardous wastes at a site are currently under a national capacity extension when the CERCLA decision document is signed, site managers should evaluate whether the response action will be completed before the extension expires. If these wastes are disposed of in surface impoundments or landfills prior to the expiration of the extension, the receiving unit would have to meet minimum technology requirements, but the wastes would not have to be treated to meet the LDR treatment standards.

APPLICABILITY DETERMINATIONS

If the site manager determines that the LDRs are applicable to the CERCLA response based on the previous three questions, the site manager must: (1) comply with the LDR restriction in effect, (2) com with the LDRs by choosing one of the L compliance options (e.g., Treatability Variance, Migration Petition), or (3) invoke an ARAR wai (available only for on-site actions). If the LDRs determined not to be applicable, then, for on- actions only, the site manager should determine if LDRs are relevant and appropriate. The process determining whether the LDRs are applicable to CERCLA action is summarized in Highlight 5.

Highlight 5 - DETERMINING WHEN LDRS ARE APPLICABLE REQUIREMENTS

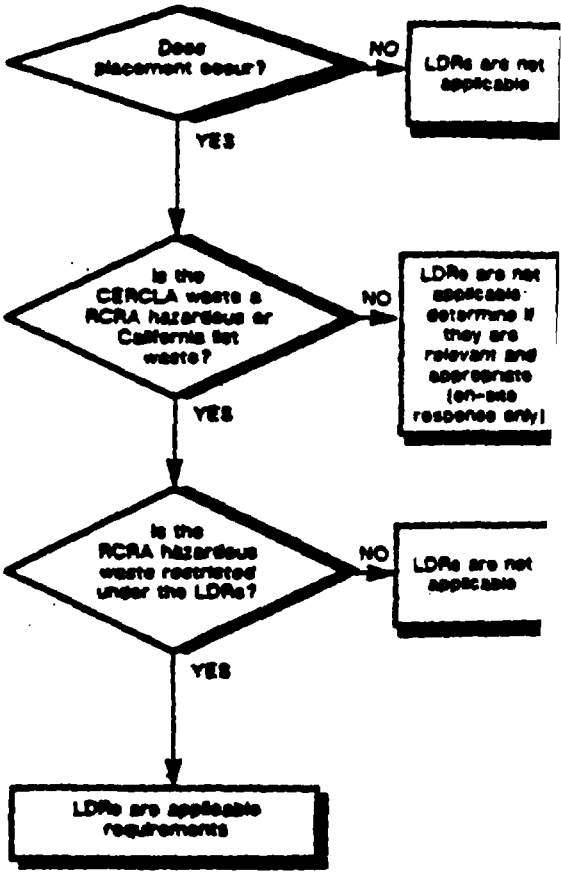


Exhibit C

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response | Superfund Publication 9347.3-06FS September 1990

EPA

Superfund LDR Guide #6A (2nd Edition)
Obtaining a Soil and Debris Treatability Variance for Remedial Actions

Office of Emergency and Remedial Response
Hazardous Site Control Division

Quick Reference Fact Sheet

The Office of Emergency and Remedial Response (OERR) issued a series of Superfund LDR Guides in July and December of 1989. This series included: *Overview of RCRA Land Disposal Restrictions (LDRs)* (Superfund LDR Guide #1); *Complying with the California List Restrictions* (Superfund LDR Guide #2); *Treatment Standards and Minimum Technology Requirements Under the LDRs* (Superfund LDR Guide #3); *Complying with the Hammer Restrictions Under the LDRs* (Superfund LDR Guide #4); *Determining When the LDRs are Applicable to CERCLA Responses* (Superfund LDR Guide #5); *Obtaining a Soil and Debris Treatability Variance for Remedial* (Superfund LDR Guide #6A) and *Removal* (Superfund LDR Guide #6B) *Actions*; and *Determining When the LDRs are Relevant and Appropriate to CERCLA Responses* (Superfund LDR Guide #7). Since the issuance of these guides, the Environmental Protection Agency, with cooperation from outside parties (e.g., environmental groups, industry representatives), has conducted an analysis of the potential impacts associated with applying the LDR treatment standards to Superfund and RCRA Corrective Action cleanups. As a result of these analyses, it was decided that the Agency will promulgate a third set of treatment standards (in addition to the wastewater and nonwastewater categories currently in effect) specifically for soil and debris wastes. In the interim, there is the presumption that CERCLA response actions involving the placement of soil and debris contaminated with RCRA restricted wastes will utilize a Treatability Variance to comply with the LDRs and that, under these variances, the treatment levels outlined in Superfund LDR Guide #6A will serve as alternative "treatment standards." This guide (a revision to the original Superfund LDR Guide #6A) has been prepared to outline the process for obtaining and complying with a Treatability Variance for soil and debris that are contaminated with RCRA hazardous wastes until such time that the Agency promulgates treatment standards for soil and debris.

BASIS FOR A TREATABILITY VARIANCE

When promulgating the LDR treatment standards, the Agency recognized that treatment of wastes to the LDR treatment standards would not always be possible or appropriate. In addition, the Agency recognized the importance of ensuring that the LDRs do not unnecessarily restrict the development and use of alternative and innovative treatment technologies for remediating hazardous waste sites. Therefore, a Treatability Variance process (40 CFR §268.44) is available to comply with the LDRs when a Superfund waste differs significantly from the waste used to set the LDR treatment standard such that:

- The LDR standard cannot be met; or
- The best demonstrated available technology (BDAT) used to set the standard is inappropriate for the waste.

Superfund site managers (OSCs, RPMs) should seek a Treatability Variance to comply with the LDRs when managing restricted soil and debris

Highlight 1: SOIL AND DEBRIS

Soil. Soil is defined as materials that are primarily of geologic origin such as sand, silt, loam, or clay, that are indigenous to the natural geologic environment at or near the CERCLA site. (In many cases, soil is mixed with liquids, sludges, and/or debris.)

Debris. Debris is defined as materials that are primarily non-geologic in origin, such as grass, trees, stumps, and man-made materials such as concrete, clothing, partially buried whole or empty drums, capacitors, and other synthetic manufactured materials, such as liners. (It does not include synthetic organic chemicals, but may include materials contaminated with these chemicals).

EXHIBIT C

wastes (see segment 1) because the LDR treatment standards are based on treating less complex matrices of industrial process wastes (except for the dioxin standards, which are based on treating contaminated soil). A Treatability Variance does not remove the requirement to treat restricted soil and debris wastes. Rather, under a Treatability Variance, alternate treatment levels based on data from actual treatment of soil, or best management practices for debris, become the "treatment standard" that must be met.

COMPLYING WITH A TREATABILITY VARIANCE FOR SOIL AND DEBRIS WASTES

Soil Wastes

- Once site managers have identified the RCRA waste codes present at the site, the next step is to identify the BDAT constituents of those RCRA waste codes and to divide these constituents into one of the structural/functional groups shown in column 1 of Highlight 2. After dividing the BDAT constituents into their respective structural/functional groups, the next step is to compare the concentration of each constituent with the threshold concentration (see column 3 of Highlight 2) and to select the appropriate concentration level or percent reduction range. If the concentration of the restricted constituent is less than the threshold concentration, the waste should be treated to within the concentration range. If the waste concentration is above the threshold, the waste should be treated to reduce the concentration of the waste to within the specified percent reduction range. Once the appropriate treatment range is selected, the third step is to identify and select a specific technology

Highlight 2: ALTERNATE TREATABILITY VARIANCE LEVELS AND TECHNOLOGIES FOR STRUCTURAL/FUNCTIONAL GROUPS

Structural Functional Groups	Concentration Range (ppm)	Threshold Concentration (ppm)	Percent Reduction Range	Technologies that achieved recommended effluent concentration guidance**
ORGANICS	Total Waste Analysis*	Total Waste Analysis*		
Halogenated Non-Polar Aromatics	0.5 - 10	100	90 - 99.9	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Dioxins	0.00001 - 0.05	0.5	90 - 99.9	Desorbtion, Soil Washing, Thermal Destruction
PCBs	0.1 - 10	100	90 - 99.9	Biological Treatment, Desorbtion, Soil Washing, Thermal Destruction
Herbicides	0.002 - 0.02	0.2	90 - 99.9	Thermal Destruction
Halogenated Phenols	0.5 - 40	400	90 - 99	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Halogenated Aliphatics	0.5 - 2	40	95 - 99.9	Biological Treatment, Low Temp. Stripping, Soil Wa Thermal Destruction
Halogenated Cyclics	0.5 - 20	200	90 - 99.9	Thermal Destruction
Nitrated Aromatics	2.5 - 10	10,000	99.9 - 99.99	Biological Treatment, Soil Washing Thermal Destruction
Heterocyclics	0.5 - 20	200	90 - 99.9	Biological Treatment, Low Temp. Stripping, Soil Wa Thermal Destruction
Polynuclear Aromatics	0.5 - 20	400	95 - 99	Biological Treatment, Low Temp. Stripping, Soil Wa Thermal Destruction
Other Polar Organics	0.5 - 10	100	90 - 99	Biological Treatment, Low Temp. Stripping, Soil Wa Thermal Destruction
INORGANICS	TCLP	TCLP		
Antimony	0.1 - 0.2	2	90 - 99	Immobilization
Arsenic	0.30 - 1	10	90 - 99.9	Immobilization, Soil Washing
Barium	0.1 - 40	400	90 - 99	Immobilization
Chromium	0.5 - 5	100	95 - 99.9	Immobilization, Soil Washing
Nickel	0.5 - 1	20	95 - 99.9	Immobilization, Soil Washing
Selenium	0.005	0.05	90 - 99	Immobilization
Vanadium	0.2 - 20	200	90 - 99	Immobilization
Cadmium	0.2 - 2	40	95 - 99.9	Immobilization, Soil Washing
Lead	0.1 - 3	300	90 - 99.9	Immobilization, Soil Washing
Mercury	0.0002 - 0.009	0.02	90 - 99	Immobilization

* *TCLP also may be used when evaluating waste with relatively low levels of organics that have been treated through an immobilization process.*

** *Other technologies may be used if treatability studies or other information indicates that they can achieve the necessary concentration or percent-reduction range.*

percent reduction. Column 5 of Highlight 2 lists technologies that (based on existing performance data) can attain the alternative Treatability Variance levels.

During the implementation of the selected treatment technology, periodic analysis using the appropriate testing procedure (i.e., total waste analysis for organics and TCLP for inorganics) will be required to ensure the alternate treatment levels for the BDAT constituents requiring control are being attained and thus can be land disposed without further treatment.

Because of the variable and uncertain characteristics associated with unexcavated wastes, from which only sampling data are available, treatment systems generally should be designed to achieve the more stringent end of the treatment range (e.g., 0.5 for chromium, see column 2 of Highlight 2) to ensure that the treatment residuals from the most contaminated portions of the waste fall below the "no exceedance" levels (e.g., 6.0 ppm for chromium). Should data indicate that the treatment levels set through the Treatability Variance are not being attained (i.e., treatment residuals are greater than the "no exceedance" level), site managers should consult with EPA Headquarters.

Site managers should use the same process for obtaining a Treatability Variance described above for types of debris that are able to be treated to the alternate treatment levels (e.g., paper, plastic). However, for most types of debris (e.g., concrete, steel pipes), which generally cannot be treated, site managers should use best management practices. Depending on the specific characteristics of the debris, these practices may include decontamination (e.g., triple rinsing) or destruction.

OBTAINING A TREATABILITY VARIANCE FOR SOIL AND DEBRIS WASTES

Once it is determined that a CERCLA waste is a soil or debris, and that compliance with the LDRs will be required (i.e., the wastes contain restricted RCRA waste(s) and placement will occur), site managers should initiate the process of obtaining a Variance. For remedial actions this will involve: (1) documenting the intent to comply with the LDRs through a Treatability Variance in the FS Report; (2) announcing the intent to comply through a Treatability Variance in the Proposed Plan; and (3) granting of the Treatability Variance by the Regional Administrator or the

Highlight 3 - INFORMATION TO BE INCLUDED IN AN RI/FS TO DOCUMENT THE INTENT TO COMPLY WITH THE LDRs THROUGH A TREATABILITY VARIANCE FOR ON-SITE AND OFF-SITE CERCLA RESPONSE ACTIONS INVOLVING THE PLACEMENT OF SOIL AND DEBRIS CONTAMINATED WITH RESTRICTED RCRA WASTES

ON-SITE

- Description of the soil or debris waste and the source of the contamination;
- Description of the Proposed Action (e.g., "excavation, treatment, and off-site disposal");
- Intent to comply with the LDRs through a Treatability Variance; and
- For each alternative using a Treatability Variance to comply, the specific treatment level range to be achieved (see Highlight 2 to determine these treatment levels).

OFF-SITE

For off-site Treatability Variances, the information above should be extracted from the RI/FS report and combined with the following information in a separate document:*

- Petitioner's name and address and identification of an authorized contact person (if different); and
- Statement of petitioner's interest in obtaining a Treatability Variance.

* This document may be prepared after the ROD is signed (and Treatability Variance granted) but will need to be compiled prior to the first shipment of wastes (or treatment residuals) to the receiving treatment or disposal facility.

LDRs as an ARAR and indicate that a Treatability Variance is being used to comply.

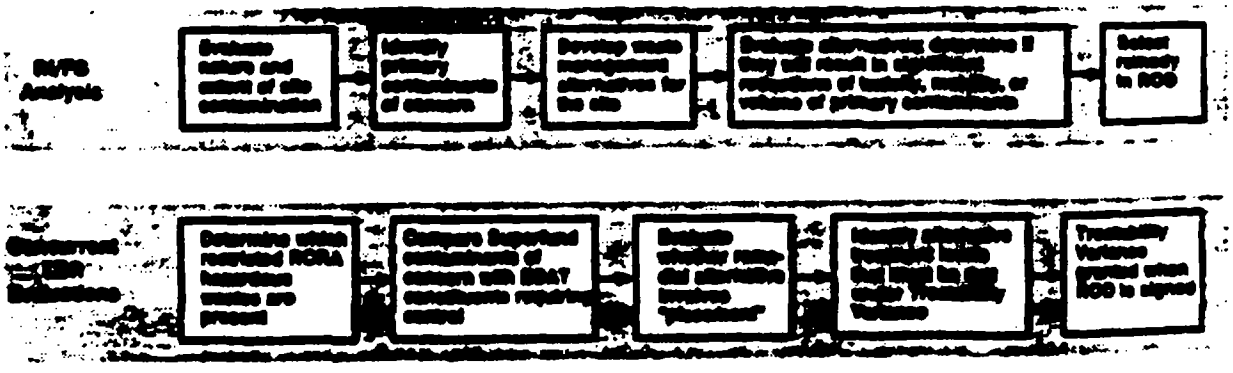
Under some circumstances, the need to obtain a Treatability Variance may not be evident until after a ROD is signed. For example, previously undiscovered evidence may be obtained during a remedial design/remedial action (RD/RA) that the CERCLA waste contains a RCRA restricted waste and the LDRs are then determined to be applicable. In such situations, a site manager would need to prepare an explanation of significant differences (ESD) from the ROD and make it available to the public to explain the need for a Treatability Variance. In addition, unlike other ESDs that do not require public comment under CERCLA section 117(c), if the ESD involves granting a Treatability Variance, an opportunity for public comment would be required to fulfill the public notice and comment requirements for a Treatability Variance under 40 CFR §268.44.

LDRs IN SUPERFUND ACTIONS

Because of the important role the LDRs may play in Superfund cleanups, site managers need to incorporate early in the RI/FS the necessary investigative and analytical procedures to determine if the LDRs are applicable for remedial alternatives that involve the "placement" of wastes. When the LDRs are applicable, site managers should determine if the treatment processes associated with the alternatives can attain either the LDR treatment standards or the alternate levels that would be established under a Treatability Variance.

Site managers must first evaluate whether restricted RCRA waste codes are present at the site, identify the BDAT constituents requiring control, and compare the BDAT constituents with the Superfund primary constituents of concern from the baseline risk assessment. This process identifies all of the constituents for which remediation may be required. Once the viable alternatives are identified in the FS, site managers should evaluate those involving the treatment and placement of restricted RCRA hazardous wastes to ensure their respective technology process(es) will attain the appropriate treatment levels (i.e., either LDR treatment standard or Treatability Variance alternate treatment levels for soil and debris containing restricted RCRA hazardous wastes) and, in accordance with Superfund goals, reductions of 90 percent or greater for Superfund primary contaminants of concern. The results of these evaluations are documented in the Proposed Plan and ROD. An illustration of the integration of LDRs and Superfund is shown in Highlight 6. An example of the process for complying with a Treatability Variance for contaminated soil and debris is presented in Highlight 7.

Highlight 6: LDRs IN THE RI/FS PROCESS



Assistant Administrator/OSWER when the ROD is signed.

FS Report

The FS Report should contain the necessary information (see Highlight 3) to document the intent to comply with the LDRs for soil and debris through a Treatability Variance. In the Detailed Analysis of Alternatives chapter of the FS Report, the discussion should specify the treatment level range(s) that the treatment technology would attain for each waste constituent restricted under the LDRs, as well as the Superfund primary contaminants of concern identified during the baseline risk assessment. In addition, under the Comparative Analysis of Alternatives section, when discussing the "Compliance with ARARs Criteria," site managers should indicate which alternatives will comply with the LDRs through the use of a Treatability Variance.

Proposed Plan

The intent to comply with the LDRs through a Treatability Variance for a particular alternative should be clearly stated in the Description of Alternatives section of the Proposed Plan. Because the Proposed Plan solicits public comment on all of the alternatives and not just the preferred option, the intent to obtain a Treatability Variance should be identified for every alternative for which a Variance would be used. This opportunity for public comment on the Proposed Plan fulfills the requirements for public notice and comment (off-site actions only) on the Treatability Variance as required in RCRA §268.44. Sample language for the Proposed Plan is provided in Highlight 4.

Highlight 4 - SAMPLE LANGUAGE FOR THE PROPOSED PLAN

Description of Alternatives section

This alternative will comply with the LDRs through a Treatability Variance under 40 CFR 268.44. This Variance will result in the use of [specify technology] to attain the Agency's interim "treatment levels/ranges" for the contaminated soil at the site (see Detailed Analysis of Alternatives Chapter of the FS Report for the specific treatment levels for each constituent).

Evaluation of Alternatives section, under "Compliance with ARARs"

The LDRs are ARARs for [Enter number] of [Enter total number of alternatives] remedial alternatives being considered. [Enter number] of the [Enter total number of alternatives] alternatives would comply with the LDRs through a Treatability Variance.

Highlight 5: SAMPLE LANGUAGE FOR A RECORD OF DECISION

Description of Alternatives section:

This alternative will comply with the LDRs through a Treatability Variance for the contaminated soil and debris. The treatment level range established through a Treatability Variance that [Enter technology] will attain for each constituent as determined by the indicated analyses are [Example shown below]:

Barium	*0.1 - 40 ppm (TCLP)*
Mercury	*0.0002 - 0.008 ppm (TCLP)*
Vanadium	*0.2 - 20 ppm (TCLP)*
TCE	*95-99.9% reduction (TWA)*
Cresols	*90-99% reduction (TWA)*

Record of Decision

A Treatability Variance is granted and becomes effective when the Record of Decision (ROD) is signed by the Regional Administrator or Assistant Administrator/OSWER. In the Description of Alternatives section, as part of the discussion of major applicable requirements associated with each remedial option, site managers should include a statement (as was done in the FS report) that a Treatability Variance will be used to comply with the LDRs, and list the treatment level range(s) that the selected technology will attain for each constituent. Sample language for the ROD is provided in Highlight 5.

In the Comparative Analysis section, under "Compliance with ARARs," site managers should indicate which of the alternatives will comply with the LDRs through a Treatability Variance. Under the Statutory Determination section (Compliance with ARARs), site managers should identify the

Highlight 7: IDENTIFICATION OF TREATMENT LEVELS FOR A TREATABILITY VARIANCE

As part of the RI, it has been determined that soils in one location at a site contain F006 wastes and cresols (which site records indicate were F004 wastes). Arsenic also was found in soils at a separate location. The baseline risk assessment identified cadmium, chromium, lead, and arse as primary contaminants of concern. The concentration range of all of the constituents found at the site included:

Constituent	Total Concentration (mg/kg)	TCLP (mg/l)	Constituent	Total Concentration (mg/kg)	TCLP (mg/l)
Cadmium	2,270 - 16,200	120 - 146	Nickel	100 - 140	1 - 6.5
Chromium	3,160 - 4,390	30 - 56	Silver	1 - 3	—
Cyanide	80 - 150	1 - 16	Cresols	50 - 600	.25 - 4
Lead	500 - 625	2 - 12.5	Arsenic	800 - 1,500	3 - 9

Four remedial alternatives are being considered: (1) Low temperature thermal stripping of soil contaminated with cresols followed immobilization of the soil; (2) Immobilization of the soil in a mobile unit; (3) In-situ immobilization; and (4) Capping of wastes. Each of th alternatives must be evaluated to determine if they will result in significant reduction of the toxicity, mobility, or volume of the waste; whet "placement" occurs; and, if "placement" occurs, whether the treatment will attain the alternative treatment levels established through a Treatabi Variance for the EDAT constituents requiring control.

STEP 1: IDENTIFY THE RESTRICTED CONSTITUENTS

- Because F006 and F004 wastes have been identified in soils at the site, the Superfund site manager must meet alternate treatment lev established through a Treatability Variance for the EDAT constituents. These constituents are: Cadmium, Chromium, Lead, Nickel, Sil and Cyanide for F006 and Cresols for F004.

AND DIVIDE THE CONSTITUENTS INTO THEIR STRUCTURAL/FUNCTIONAL GROUPS (see Highlight 2):

- All of the F006 constituents are in the Inorganics structural/functional group.
- Cresols are in the Other Polar Organic Compounds structural/functional group.
- In accordance with program goals, the preferred remedy also should result in the effective reduction (i.e., at least 90 percent) of all prim constituents of concern (i.e., Cadmium, Chromium, Lead, and Arsenic).

STEP 2: COMPARE THE CONCENTRATION THRESHOLD FOUND IN HIGHLIGHT 3 TO THE CONCENTRATIONS FOUND AT THE SI AND CHOOSE EITHER THE CONCENTRATION LEVEL RANGE OR PERCENT REDUCTION RANGE FOR EACH RESTRICT CONSTITUENT.

Constituent	Site Concentration	Threshold Concentration	Appropriate Range: Concentration	Appropriate Range: Percent Reduction	Range to be achieved (immediate analysis)
Cadmium	120 - 146 ppm	> 40 ppm		X	99-99.9 Percent Reduction (TCL
Chromium	30 - 56 ppm	< 120 ppm	X		0.5 - 6 ppm (TCLP)
Lead	2 - 12.5 ppm	< 300 ppm	X		0.1 - 3 ppm (TCLP)
Nickel	1 - 6.5 ppm	< 20 ppm	X		0.5 - 1 ppm (TCLP)
Cresols (Total)	50 - 600 ppm	> 100 ppm	X		90-99 Percent Reduction (TCL
Cresols (TCLP)	.25 - 4 ppm			X	
Arsenic	3 - 9 ppm	< 10 ppm	X		0.27 - 1 ppm (TCLP)

STEP 3: IDENTIFY TREATMENT TECHNOLOGIES THAT MEET THE TREATMENT RANGES.

- Highlight 3 lists the technologies that achieved the alternate treatment levels for each structural/functional group.
- Because cresols are present in relatively low concentrations (assumed for the purposes of this example), a TCLP may be used to determin Immobilization results in a sufficient reduction of mobility of this restricted RCRA hazardous waste. (Measures to address any volatilization organics during immobilization processes will be necessary.)
- Based on the results of treatability tests conducted at the site, immobilization also will result in the effective reduction in leachability (i.e., at le 90 percent) of arsenic, a Superfund primary contaminant of concern.

Alternative	Effective Reduction of Toxicity, Mobility, Volume?	"Placement"?	Meet Treatability Variance Alternate Levels?
1. Low temperature stripping/ Immobilization	Yes	Yes	Yes
2. Immobilization in mobile unit	Yes	Yes	Yes
3. In-situ immobilization	Yes (Mobility)	No (LDRs not ARARs)	—
4. Capping in Place	No	No (LDRs not ARARs)	—

STEP 4: PREPARE PROPOSED PLAN, OBTAIN COMMENTS

- Highlight 4 provides sample language for the Proposed Plan that announces the intent to comply with the LDRs through a Treatability Varia

STEP 5: PREPARE ROD

- Highlight 5 provides sample language for a ROD signed for a site that will comply with the LDRs through a Treatability Variance.

Exhibit D

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 3 1990

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE
OSWER Directive # 9833.3A-1

MEMORANDUM

SUBJECT: Final Guidance on Administrative Records for Selecting CERCLA Response Actions

FROM: Don R. Clay
Assistant Administrator

TO: Regional Administrators, Regions I-X

This memorandum transmits to you our "Final Guidance on Administrative Records for Selecting CERCLA Response Actions." This document replaces the "Interim Guidance on Administrative Records for Selection of CERCLA Response Actions," previously issued on March 1, 1989.

The guidance sets forth the policy and procedures governing the compilation and establishment of administrative records for selecting response actions under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). This guidance is also consistent with and expands on Subpart I of the National Oil and Hazardous Substances Pollution Contingency Plan, 55 Fed. Reg. 8859 (March 8, 1990).

This guidance reflects input received from the Regions, Headquarters and the Department of Justice. There have been several drafts of this guidance and comments have been incorporated. I thank you for your assistance.

Attachment

cc: Director, Waste Management Division,
Regions I, IV, V, and VII
Director, Emergency and Remedial Response Division,
Region II
Director, Hazardous Waste Management Division,
Regions III, VI, VIII, and IX
Director, Hazardous Waste Division, Region X
Director, Environmental Services Division,
Regions I, VI, and VII
Regional Counsel, Regions I-X
Administrative Record Coordinators, Regions I-X

OSWER Directive No. 9833.3A-1

FINAL GUIDANCE ON ADMINISTRATIVE RECORDS FOR SELECTING CERCLA RESPONSE ACTIONS

U.S. Environmental Protection Agency
Office of Solid Waste and Emergency Response
Washington, D.C. 20460

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I. INTRODUCTION

A. Purpose and Scope of the Administrative Record

This guidance addresses the establishment of administrative records under Section 113 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).[1] Section 113(k)(1) of CERCLA requires the establishment of administrative records upon which the President shall base the selection of a response action (see Appendix A for the complete statutory language).

Chapter I of this guidance introduces the purpose and scope of the administrative record. Chapter II reviews procedures for compiling and maintaining the administrative record. Chapter III examines the various types of documents which should be included in the administrative record. Chapter IV discusses how agencies outside EPA are involved in establishing the record. Finally, this guidance includes a glossary of frequently used terms and acronyms as well as several appendices.

Although this guidance is written for use by the United States Environmental Protection Agency (EPA), it can be adapted for use by state and federal agencies required to establish administrative records for the selection of CERCLA response actions. As used in this guidance the term "lead agency" means either EPA, a state or other federal agency, which is responsible for compiling and maintaining the administrative record. As used in this guidance, the term "support agency" means the agency or agencies which furnish necessary data to the lead agency, reviews response data and documents and provides other assistance as requested by the OSC or RPM. This guidance reflects the revisions to the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) published on March 8, 1990, 55 Fed. Reg. 8859 (see Appendices L and M).

The administrative record established under Section 113(k) of CERCLA serves two primary purposes. First, the record contains those documents which form the basis for selection of a response action and under Section 113(j), judicial review of any issue concerning the adequacy of any response action is limited to the record. Second, Section 113(k) requires that the administrative record act as a vehicle for public participation

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[1] 42 U.S.C. §9613. References made to CERCLA throughout this memorandum should be interpreted as meaning "CERCLA, as amended by SARA."

in selecting a response action. This guidance document discusses procedures developed to ensure that the lead agency's administrative records meet these twin purposes.

The administrative record is the body of documents that "forms the basis" for the selection of a particular response at a site. This does not mean that documents which only support a response decision are placed in the administrative record. Documents which are included are relevant documents that were relied upon in selecting the response action, as well as relevant documents that were considered but ultimately rejected (e.g., documents "considered or relied on").

This document uses the phrase "considered or relied on" in discussing which documents should be included in the administrative record to indicate that it is EPA's general policy to be inclusive for placing documents in the administrative record. However, this term does not mean that drafts or internal documents are normally included in the administrative record. Lead or support agency draft or internal memoranda are generally not included in the administrative record, except in specific circumstances (see section III.G. at page 33). Thus, the record will include final documents generated by the lead and support agency, as well as technical and site-specific information. Information or comments submitted by the public or potentially responsible parties (PRPs) during a public comment period (even if the lead agency does not agree with the information or comments) are also included in the administrative record (see section III.D. at page 30).

The following principles should be applied in establishing administrative records:

- The record should be compiled as documents relating to the selection of the response action are generated or received by the lead agency;
- The record should include documents that form the basis for the decision, whether or not they support the response selection; and
- The record should be a contemporaneous explanation of the basis for the selection of a response action.

The effort to establish adequate administrative records encompasses a vast array of people including: Administraive Record Coordinators, Remedial Project Managers (RPMs), On-Scene Coordinators (OSCs), enforcement staff, records management staff, Regional Counsel staff, Community Relations Coordinators (CRCs), other federal agencies, states, CERCLA contractors, and the

public.[2] This guidance will discuss the roles and responsibilities of these people and how they interact with one another.

B. Judicial Review

Section 113(j)(1) of CERCLA provides that judicial review of any issues concerning the adequacy of any response action shall be limited to the administrative record.

Judicial review based on an administrative record provides numerous benefits. Under Section 113(j) of CERCLA and general principles of administrative law, when the trial court reviews the response action selected, the court is limited to reviewing the documents in the administrative record. As a result, facts or arguments related to the response action that challenging parties present for the first time in court will not be considered.

Record review saves time by limiting the scope of trials, thereby saving the lead agency's resources for cleanup rather than litigation. Courts will not allow a party challenging a decision to use discovery, hearings, or additional fact finding to look beyond the lead agency's administrative record, except in very limited circumstances. In particular, courts generally will not permit persons challenging a response decision to depose, examine, or cross-examine EPA, state or other federal agency decisionmakers, staff, or contractors concerning the selection of the response action.

Furthermore, the administrative record may be cited long after officials responsible for the response decisions have moved into different positions or have left the lead or support agency. Judicial review limited to the record saves time involved in locating former employees who may not remember the facts and circumstances underlying decisions made at a much earlier time.

Moreover, in ruling on challenges to the response action decision, the court will apply the highly deferential "arbitrary and capricious" standard of review set forth in Section 113(j)(2) of CERCLA. Under this standard, a court does not substitute its judgment for that of the decisionmaker. The reviewing court does not act as an independent decisionmaker, but rather acts as a reviewing body whose limited task is to check for arbitrary and capricious action. Thus, the court will only overturn the response selection decision if it can be shown on the

[2] As used hereinafter in this guidance the term "public" includes potentially responsible parties (PRPs).

administrative record, that the decision was arbitrary and capricious or otherwise not in accordance with the law. However, the extent to which EPA benefits from having judicial review limited to the record depends on the quality and completeness of each record.

C. Public Participation

Section 113(k)(2) of CERCLA requires that the public have the opportunity to participate in developing the administrative record for response selection. Section 117 of CERCLA also includes provisions for public participation in the remedial action selection process.[3] Both sections reflect a statutory emphasis on public participation. Participation by interested persons will ensure that the lead agency has considered the concerns of the public, including PRPs, during the response selection process. In addition, for purposes of administrative and judicial review, the record will contain documents that reflect the participation of the public and the lead agency's consideration of the public's concerns.

If the lead agency does not provide an opportunity for involvement of interested parties in the development of the administrative record, persons challenging a response action may argue that judicial review should not be limited to the record. The lead agency must, therefore, make the information considered or relied on in selecting a response action available to the public, provide an appropriate opportunity for public comment on this information, place comments and information received from the public in the record, and reflect in the record the lead agency's consideration of this information.

II. PROCEDURES FOR ESTABLISHING THE ADMINISTRATIVE RECORD

A. Administrative Record Coordinator

Each region should have an Administrative Record Coordinator. The Record Coordinator generally has the duty of ensuring that the administrative record files are compiled and maintained according to Subpart I of the NCP and this guidance.[4]

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[3] 42 U.S.C. §9617.

[4] The "administrative record file" should be distinguished from the "administrative record." The administrative record file refers to the documents as they are being compiled. Until a response action decision has been selected, there is no complete administrative record for that decision. Thus, to avoid creating the impression that the record is complete at any time prior to

The Record Coordinator will not be responsible for deciding which documents are included in a record file. Those decisions should be made by the OSC or RPM, with appropriate consultation of ORC staff. The Record Coordinator's duties ordinarily include:

- Developing procedures for creating record files;
- Ensuring that the public is notified that the record files are available for inspection;
- Ensuring that the records are available at or near the site;
- Ensuring that the records are available at the regional office or other central location;
- Coordinating efforts to obtain the necessary documents;
- Indexing the record files;
- Updating the record files and indices on a regular basis (e.g., quarterly);
- Ensuring availability of the record file for copying;
- Ensuring that sampling and testing data, quality control and quality assurance documentation, and chain of custody forms are available for public inspection, possibly at a location other than that of the record files;
- Coordinating with ORC staff on questions of relevance and confidentiality of documents submitted for the record files;
- Arranging for production and presentation of the record to court when necessary for judicial review;
- Maintaining the confidential portion of the record files, if necessary;
- Maintaining the "Compendium of CERCLA Response Selection Guidance Documents";
- Coordinating with states and federal agencies on record files compiled by them; and

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the final selection decision, the set of documents is referred to as the administrative record file rather than the administrative record.

- Notifying appropriate personnel of the timing for review of state and federal record files.

Appendix D contains a model position description for an Administrative Record Coordinator.

The Record Coordinator must work closely with RPMs, OSCs, enforcement staff, records management staff, Regional Counsel staff, community relations staff, and the Department of Justice (DOJ) (for cases in litigation).

If the way the record was compiled and maintained is questioned in litigation, the Record Coordinator may be called upon to prepare an affidavit or testify about those procedures. Therefore, the Record Coordinator should be familiar with the procedures associated with the record, and be qualified to fulfill the responsibilities outlined above.

B. Multiple Response Actions

In general, every decision document (e.g., Record of Decision (ROD) or Action Memorandum) must be supported by an administrative record. Under CERCLA, cleanups are often broken up into distinct response actions. At a given site this may include several removal actions, and/or remedial actions known as operable units. For every removal action or operable unit, a separate administrative record must be compiled.

Information relevant to more than one response decision, such as a site inspection report or a preliminary assessment report may be placed in the record file for an initial response action and incorporated by reference in the indexes of subsequent record files for that site.

C. Compilation

The administrative record file should be compiled as relevant documents on the response action are generated or received. Thus, all documents which are clearly relevant and non-privileged should be placed in the record file, entered into the index, and made available to the public as soon as possible. For example, the remedial investigation/feasibility study (RI/FS) work plan, summaries of quality assured data, the RI/FS released for public comment, the proposed plan, and any public comments received on the RI/FS and proposed plan should be placed in the record file as soon as they are generated or received.

When there are questions whether particular documents should be included in the record file, such documents can be segregated and reviewed at regular intervals (e.g., quarterly). For

example, draft documents or documents subject to claims of privilege should be set aside for review by ORC and other appropriate staff. At critical times, such as prior to the public comment period, the issues regarding these documents should be completely resolved and the documents included in the record file, if appropriate.

The record file should be updated while it is available for public inspection. The additional documents should be placed in the record file and entered in the index. Any updates to the record file should be made to all copies of the record file.

All documents considered or relied on in selecting the response action should be in the record file when a decision document (e.g., a record of decision) is signed. Documents relevant to the response selection but generated or received after the decision document is signed should be placed in a post-decision document file and may be added to the administrative record file in certain circumstances (see section III.N. at page 40).

D. Index

Each administrative record file must be indexed. The index plays a key role in enabling both lead agency staff and members of the public to help locate and retrieve documents included in the record file. In addition, the index can be used for public information purposes or identifying documents located elsewhere, such as those included in the compendium of guidance documents (see Appendix E). The index also serves as an overview of the history of the response action at the site.

The index also provides the lead agency with a degree of control over documents located at or near the site. The creation of an index will prevent persons from altering the record simply by physically adding or removing documents from the record file.

The index should include the following information for each document:

- Document Number;
- Document Date - date on the document;
- Document Title - one or two line identification. Identify the actual document, not a transmittal memo or other less relevant document. Include sufficient information so the document cannot be confused with another (e.g., the title "report" may be insufficient);

- Author - Name and affiliation;
- Recipient - Name and affiliation; and
- Document Location.

The index can be organized either by subject or in chronological order. If documents are customarily grouped together, as with sampling data and chain of custody documents, they may be listed as a group in the index to the administrative record file. Appendix C contains a model index organized by subject. Computer databases have been helpful in generating and updating the index.

The index should be updated when the record file is updated. It is preferable to update the record file when documents are received or at least quarterly. Such updates should coincide with the periodic updating of the record file and review of material for which there are questions about relevance or privilege (see section II.C. at page 6). The index should also be updated before any public comment period commences. The index should be labeled "draft index" until all relevant documents are placed in the record file. When the decision document is signed, the draft index should be updated and labeled "index."

E. Location

E.1. General

Section 113(k)(1) of CERCLA requires that the administrative record be available to the public "at or near the facility at issue."[5] Duplicates of the record file may be kept at any other location. A copy of the record file must be located at the regional office or other central location. Both copies of the record file should be available for public inspection at reasonable times (e.g., 9-4, Monday-Friday). In the case of an emergency removal, unless requested, the record file needs to be available for public inspection only at the central location (see section II.F.3. at page 14).[6]

The record file located at or near the site should be placed in one of the information repositories which may already exist for community relations purposes. These are typically located in a library, town hall, or other publicly accessible place. If there is no existing information repository, or if the repository

[5] See 40 C.F.R. §300.805.

[6] 40 C.F.R. §§300.805(a)(5) and (b).

does not have sufficient space for the record file, any other publicly accessible place may be chosen to house the record file.[7] When a Superfund site is located at or near an Indian reservation, the centrally located copy of the record file may be located at the Indian tribal headquarters. The Community Relations Coordinator (CRC) should be consulted on the location of the information repository and record file.

The record file should be transmitted to the local repository in coordination with the CRC. The CRC should make the initial contact to establish the local repository and request housing for the record file. The Record Coordinator should make arrangements for delivering the record file to the local repository.

The record file should include an introductory cover letter addressed to the librarian or repository manager (see Appendix F). In addition, a transmittal acknowledgement form should be included to ensure receipt of the record file (see Appendix G). Finally, an administrative record fact sheet should accompany the record to answer questions from the public (see Appendix H). Updates to the record file should be handled in a similar fashion (see section II.C. at page 6).

In addition to the publicly available record file, if feasible, a master copy of the record file should be kept at the regional office or other central location of the lead agency. To preserve the integrity of the master copy of the record file, it should not be accessible to the public. If not feasible to establish a master copy, the lead agency will need to establish an effective security system for the publicly available record file. The master copy of the record file may be maintained in microform to conserve storage space (see section II.J. at page 21).

E.2. Special Documents

Certain documents which are included in the record file do not have to be maintained at or near the site or, in some cases, at the regional office or other central location, because of the nature of the documents and the burden associated with maintaining such documents in multiple locations. These documents, however, must be incorporated in the record file by reference (e.g., in the index but not physically in the record

[7] If the site is located at a federal facility which requires security clearance, the administrative record file for that site must be located where security clearance is not required. The public must have free access to the record file.

file), and the index must indicate where the documents are publicly accessible. Where a document is listed in the index but not located at or near the site, the lead agency must, upon request, include the document in the record file at or near the site.[8] This applies to verified sampling data, chain of custody forms, and guidance and policy documents. It does not apply to documents in the confidential file.

Unless requested, the following types of documents do not have to be located in multiple locations:

Verified Sampling Data[9]

Verified sampling data do not have to be located in either administrative record file. The sampling data may be left in its original storage location (e.g., Environmental Services Division (ESD) or contract laboratory). Data summary sheets, however, must be located in the record file. The index must list the data summary sheets, reference the underlying verified sampling data, and indicate where the sampling data can be found.

Chain of Custody Forms[10]

As with verified sampling data, chain of custody forms do not have to be located in either administrative record file. The chain of custody forms may be left in the original storage location. The index must reference the chain of custody forms and indicate their location.

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[8] 40 C.F.R. §300.805(b).

[9] 40 C.F.R. §300.805(a)(1). "Verified sampling data" are data that have undergone the quality assurance and quality control process. "Invalidated sampling data" have been incorrectly gathered or analyzed and will not be part of the record file. "Unvalidated sampling data" are data which has not yet undergone the quality assurance and quality control process. Because it is superseded by verified data, the unvalidated data are not generally part of the record files. However, such data may in some cases be relied on in selecting a response action, such as an emergency removal where there is no time for verification. Unvalidated sampling data which are relied on in selecting a response action should be included in the record file.

[10] 40 C.F.R. §300.805(a)(1).

Confidential and Privileged Documents[11]

When a confidential or privileged document is included in the record file, it should be kept in a confidential portion of the record file. The confidential file should be kept in a locked cabinet at the regional office or other central location. It should not be located at or near the site. The index should identify the title and location of the document, and describe why the lead agency considers it confidential or privileged. Furthermore, the lead agency should summarize or redact the document to make available, to the extent feasible, factual information (especially if such information is not found elsewhere in the record file and is not otherwise available to the public). This summary or redaction should be performed as soon as possible after the determination that a document is privileged or confidential, and inserted in the portion of the record file available to the public and included in the index. See also section III.H. at page 34.

Guidance and Policy Documents[12]

Guidance and policy documents that are not site specific are available in a compendium located in the regional office. ("Compendium of CERCLA Response Selection Guidance Documents," Office of Waste Programs Enforcement, May 1989.) This eliminates the need for reproducing copies of frequently used documents for each site record file. The documents in the compendium need not be physically included in the record file, but the guidance and policy documents considered or relied on in selecting the response action must be listed in the record file index along with their location and availability. See also section III.I. at page 37 and Appendix E.

Technical Literature[13]

Publicly available technical literature that was not generated for the site at issue (e.g., an engineering textbook), does not have to be located in the regional office or other central location or at or near the site. The document must be clearly referenced in the index. However, technical literature not publicly available must be physically included in the record file at the regional office or other central location and at or near the site. See also section III.J. at page 38.

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[11] 40 C.F.R. §300.805(a)(4).

[12] 40 C.F.R. §300.805(a)(2).

[13] 40 C.F.R. §300.805(a)(3).

F. Public Availability

F.1. General

Section 113(k) of CERCLA specifies that the administrative record "shall be available to the public." In satisfying this provision, the lead agency must comply with all relevant public participation procedures outlined in Sections 113(k) and 117 of CERCLA. The NCP (see Appendices L and M) contains additional requirements on public availability (see also "Community Relations in Superfund: A Handbook," October 1988 - OSWER Directive No. 9230.0-3A; "Community Relations During Enforcement Activities," November 3, 1988 - OSWER Directive No. 9836.0-1A).

The availability of the record file will vary depending upon the nature of the response action. Different procedures are outlined below for remedial and removal response actions.

In all cases, the lead agency should publish a notice of availability of the record file when the record file is first made available for public inspection in the vicinity of the site at issue.[14] The notice should explain the purpose of the record file, its location and availability, and how the public may participate in its development.

The notice should be published in a major local newspaper of general circulation. The newspaper notices should be distributed to persons on the community relations mailing list. These notices should also be sent to all known PRPs if they are not already included on the community relations mailing list. As PRPs are discovered, the lead agency should add their names to the community relations mailing list and mail them all the notices sent to the other PRPs. Publication of the notice should be coordinated with the community relations staff. A copy of the notice of availability and list of recipients should be included in the record file. Appendix I contains a model notice of availability.

This public notice may be combined with other notices for the same site, such as a notice of availability of the community relations information repository, if they occur at the same time. In addition to the required newspaper notice, the public can be informed of the availability of the record file through existing mechanisms (e.g., general and special notice letters, Section 104(e) information requests, and the community relations mailing list). In addition, Headquarters will publish notices in the

[14] See 40 C.F.R. §300.815(a) and §§300.820(a)(1) and (b).

Federal Register. They will be published quarterly and will list sites where remedial activity is planned.

F.2. Remedial Actions

The administrative record file for a remedial action must be available for public inspection when the remedial investigation begins.[15] For example, when the remedial investigation/ feasibility study (RI/FS) work plan is approved, the lead agency must place documents relevant to the selection of the remedy generated up to that point in the record file. Documents generally available at that time include the preliminary assessment (PA), the site investigation (SI), the RI work plan, inspection reports, sampling data, and the community relations plan. The lead agency must continue to add documents to the record file periodically after they are generated or received during the RI/FS process.

The record file must be publicly available both at a regional office or other central location and at or near the site (see section II.E. at page 8).[16] In addition, the notice of availability should be sent to persons on the community relations mailing list, including all known PRPs.

With the completion of the RI/FS, the lead agency should undertake the following public participation procedures:

- Prepare a proposed plan which briefly analyzes the remedial alternatives evaluated in the detailed analysis of the RI/FS and proposes a preferred remedial action alternative;
- Make the RI/FS report and proposed plan available in the record files both at a regional office or other central location and at or near the site;
- Publish in a major local newspaper of general circulation a notice of availability and brief analysis of the RI/FS report and proposed plan. The notice should include the dates for submission of public comments;
- Mail the notice or copy of the notice to all PRPs on the community relations mailing list;
- Provide a formal comment period of not less than 30 calendar days for submission of comments on the proposed plan. Upon

[15] 40 C.F.R. §300.815(a).

[16] 40 C.F.R. §300.805(a).

timely request the lead agency will extend the public comment period by a minimum of 30 additional days.[17] [Note: The lead agency is encouraged to consider and respond to significant comments that were submitted before the public comment period. Considering early comments provides practical benefits both substantively and procedurally. Early comments may provide important information for the selection decision, and early consideration provides the public (and, particularly, PRPs) with additional informal opportunities for participating in the decisionmaking process.];

- Provide the opportunity for a public meeting(s) in the affected area during the public comment period on the RI/FS and proposed plan;
- Keep a transcript of the public meeting(s) on the RI/FS and proposed plan held during the comment period and include a copy of the transcript in the record file;
- Prepare a discussion (to accompany or be part of the decision document) of any significant changes to the proposed plan which occurred after the proposed plan was made available for public comment which are reflected in the ROD;
- Prepare a response to each of the significant comments submitted during the public comment period to accompany the ROD (see section III.D. at page 30); and
- Publish in a major local newspaper of general circulation a notice of the availability of the ROD and make the ROD available to the public before beginning any remedial action, as required under Section 117(b) of CERCLA.

Comments received after signing the ROD should be placed in a post-decision document file and may be added to the record file in certain situations (see section III.N. at page 40).

F.3. Removal Actions

Section 113(k)(2)(A) of CERCLA requires that the EPA establish procedures for the appropriate participation of interested persons in the development of the administrative record for the selection of a removal action. "Appropriate" participation depends on the nature of the removal, as outlined below.

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[17] 40 C.F.R. §300.430(f)(3)(i)(c).

Time-critical Removal Actions

A time-critical removal action is a removal action for which, based on the site evaluation, the lead agency determines that a period of less than six months exists before on-site removal activities must be initiated. This category includes emergency removal actions which are described in greater detail below.

The administrative record file for these actions must be available for public inspection no later than 60 days after the initiation of on-site removal activity. Where possible, the record file should be made available earlier. The record file must be available both at the regional office or other central location and at or near the site at issue.

If, however, on-site cleanup activity is initiated within hours of the verification of a release or threat of a release and on-site cleanup activities cease within 30 days (emergency actions), the record file need only be available at the regional office or other central location, unless it is requested that a copy of the record file be placed at or near the site.[18]

For all time-critical removals, a notice of the availability of the record file must be published in a major local newspaper and a copy of the notice included in the record file. This notice should be published no later than 60 days after initiation of on-site removal activity.[19]

A public comment period of not less than 30 days should be held in appropriate situations.[20] In general, a public comment period will be considered appropriate if cleanup activity has not been completed at the time the record file is made available to the public and if public comments might have an impact on future action at the site. If a public comment period is considered appropriate, it should begin at the time the record file is made available for public inspection. Note, however, that even if an action is completed before the record file is available, the record file should be made available to the public. The notice for the public comment period may be combined with the notice of availability of the record file if they occur at the same time. The notice should be mailed to all PRPs on the community

[18] 40 C.F.R. §300.805(b).

[19] 40 C.F.R. §300.415(m)(2)(i).

[20] 40 C.F.R. §300.415(m)(2)(ii).

relations mailing list. The notice should also be sent to all known PRPs if they are not already on the community relations mailing list.

The lead agency must respond to all significant comments received during the public comment period and place the comments and the responses to them in the record file (see section III.D. at page 30).[21] Whether or not the lead agency holds a public comment period, comments received by the lead agency before the decision document is signed and related to the selection of the removal action must be placed in the record file. For information, including comments, generated or received after the decision document is signed, see section III.N. at page 40.

Non-Time-Critical Removal Actions

A non-time-critical removal action is a removal action for which, based on the site evaluation, the lead agency determines that a planning period of at least six months exists before on-site removal activities must be initiated.

The administrative record file for a non-time-critical removal action must be made available for public inspection when the engineering evaluation/cost analysis (EE/CA) is made available for public comment.[22] The record file must be available at the regional office or other central location and at or near the site. A notice of the availability of the record file must be published in a major local newspaper and a copy of the notice included in the record file. The notice should be published in a major local newspaper of general circulation. In addition, Headquarters will publish these notices in the Federal Register. They will be published quarterly and will list sites where non-time critical removal activity is planned. The newspaper notice should be distributed to persons on the community relations mailing list and placed in the record file. These notices should also be sent to all known PRPs if they are not already on the community relations mailing list. As PRPs are discovered, the lead agency should add their names to the community relations mailing list and mail them all the notices sent to the other PRPs. Publication of the notice should be coordinated with the community relations staff. A copy of the notice of availability should be included in the record file. Appendix I contains a model notice of availability.

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[21] 40 C.F.R. §300.415(m)(2)(iii).

[22] 40 C.F.R. §300.415(m)(4).

A public comment period on the EE/CA of not less than 30 days must be held so that interested persons may submit comments on the response selection for the record file. Upon timely notice, the lead agency will extend the public comment period by a minimum of 15 days.[23] A notice of the public comment period may be combined with the notice of availability of the record file if they occur at the same time. The lead agency must respond to all significant comments received during the public comment period and place the comments and the responses to them in the record file (see section III.D. at page 30).[24]

The lead agency is encouraged to consider and respond to significant comments that were submitted before the public comment period. Considering early comments provides practical benefits both substantively and procedurally. Early comments may provide important information for the selection decision, and early consideration provides the public (and, particularly, PRPs) with additional informal opportunities for participating in the decision making process.

Comments generated or received after the decision document is signed should be kept in a post-decision document file. They may be added to the record file in certain situations (see section III.N. at page 40).

G. Maintaining the Record

Document room procedures should be established to ensure orderly public access to the record files. In establishing public access procedures, the security and integrity of the record files must be maintained at all times.

Each regional office or other central location should have a reading area where visitors are able to review the record files. The record file must be available during reasonable hours (e.g., 9-4, Monday-Friday). The public reading area should include, wherever feasible:

- Administrative record files;
- Guidance Compendium (see section III.I. at page 37);
- Access to a copier; and
- Sign-in book.

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[23] 40 C.F.R. §300.415(m)(4)(iii).

[24] 40 C.F.R. §300.415(m)(4)(iv).

Controlled access to the files is accomplished by use of a visitor sign-in book. Sign-in books help minimize instances in which documents are lost or damaged. They also provide documentation of the lead agency's efforts to provide public access to the record files. Pertinent information recorded in the book should include:

- Date of visit;
- Name;
- Affiliation;
- Address;
- Phone number;
- Site documents viewed; and
- Cost of copied materials (if applicable).

The lead agency may choose not to use sign-in books if the books deter the public from reviewing the record files.

Since documents in the record file should be complete, properly organized and legible, the integrity of the record file must be maintained. If possible, storage and reading areas should be supervised to maintain proper security. Documents should not leave the document room or be left unattended. To the extent feasible, the Administrative Record Coordinator should check the order of the documents after being viewed by the public to be certain all documents have been returned intact. The documents in the record file should be kept secure, either in a locked room or in locked cabinets.

The record file located at or near the site should be handled with similar care. If possible, the record file should be treated as a non-circulating reference; it should not leave the local repository except under supervision. The phone number of a record file contact should be provided to record file users and to the manager of the local repository so that problems can be identified and resolved. This information can be included in an informational fact sheet accompanying the record file (see Appendix H). In addition, the Record Coordinator should plan periodic reviews of the local record files.

Where the site is a fund-lead or PRP-lead, EPA should retain (in addition to the publicly available record file) a master copy of the record file at the regional office or other central

location, if feasible. Where a state or other federal agency is the lead agency at a site, EPA should assure that the state or other federal agency maintains (in addition to the publicly available record file) a master copy of the record file. The record files are permanent records that must be retained.

As to the local repository, the statute and regulations are silent concerning the duration of public availability of the record file. The lead agency's primary concern is public participation in development of the administrative record. Following initiation of the response action, public interest in background information other than the Record of Decision or RI/FS may wane. In any event, the statutory provisions for judicial review and deadlines for filing cost recovery actions provide useful references for keeping the record file publicly available. See Sections 113(g) and (h) of CERCLA.

Where there is ongoing (or possible) litigation, the record file in the regional or other central location should be available at least until the litigation is over.

The record file continues to serve as a historical record of the response selection, even after the statute of limitations for cost recovery action has passed. Where there is considerable public interest, the local repository may wish to keep the record file available for public viewing.

H. Confidential File

In certain situations, documents in the record file may be subject to an applicable privilege (see section III.H. at page 34). To the extent feasible, information relevant to the response selection which is contained in a privileged document should be summarized or redacted as to make the document disclosable and then included in the publicly accessible portion of the record file. The privileged document should be included in a confidential portion of the record file.[25]

The Administrative Record Coordinator should maintain a confidential portion of the record file for privileged documents. These documents should be listed in the index to the entire record file and identified as "privileged." The index should identify the title and location of the privileged document, and describe the basis for the asserted privilege.

The confidential portion of the record file should be stored in locked files at the regional office or other central location

[25] See 40 C.F.R. §300.810(d).

and should not be located at or near the site. The confidential portion of the record file should be separate from the publicly available record file to protect against inadvertent disclosure. Each privileged document should be stamped "confidential" at the bottom of each page of the document. Where the material is not a written document (such as a computer disk or cassette tape) the jacket should be stamped "confidential." A complete list of all materials contained in the confidential portion of the record file should be maintained by the Record Coordinator. The Record Coordinator should also maintain a log which will include the time, date, document name, and will identify persons checking out and returning materials to the confidential file.

As soon as a new record file is established, a routine access list for the confidential file should be prepared for each record file. When EPA is the lead agency, this routine access list must be approved by the Waste Management Division Director or the Environmental Services Division Director, and ORC. Once approval is given, persons on the list will be able to access the confidential files through the Record Coordinator. No one should have access to the confidential files other than those identified on the routine access list. For state or other federal agency-lead sites, the Regions should take steps to insure that state or other federal agencies develop routine confidential file access list procedures.

This policy and procedure for privileged materials does not supersede any policy and procedures established under the Freedom of Information Act (FOIA), 5 U.S.C. §552, and EPA regulations implementing FOIA at 40 C.F.R. Part 2. Upon receipt of requests for the administrative record file pursuant to FOIA, if the requester is in close proximity to the record file, the lead agency may respond to FOIA requests by telling a requester the location and availability of the record file. Decisions regarding disclosures of materials under FOIA should be coordinated among the various lead agency officials with access to such materials.

I. Copying

Section 117(d) of CERCLA requires that each document developed, received, published, or made available to the public under Section 117 be made available for public inspection and copying at or near the site. Under Section 113(k)(2)(B) of CERCLA, these documents must also be included in the administrative record file. Under these provisions of CERCLA, the lead agency must ensure that documents in the record file are available for copying, but does not bear responsibility for copying the documents themselves. Therefore, it is preferable

that are produced in the regular course of business are likely to be admissible in court.

The Office of Information Resources Management (OIRM) has granted approval for the use of micrographics in establishing administrative records (see Appendix J). Any use of micrographics should still comply with the remaining provisions of Chapter 6 of the EPA Records Management Manual (7/13/84).

K. Certification

A certification as to the completeness of the administrative record must be performed when the record is filed in court. Appendix K contains a model court certification.

When EPA is the lead agency such certification should be signed by the Regional Administrator's designee, after consultation with ORC. Any certification of the record should be made by program staff and not legal staff. The region may also choose to have the Administrative Record Coordinator certify that the record was compiled and maintained in accordance with applicable agency regulations and guidance. Such certification would attest that the record was compiled in accordance with current agency procedures and would not address the completeness of the record file.

If a state or other federal agency is the lead agency that agency must certify that the record was compiled and maintained in accordance with applicable EPA regulations and guidance. After the state or federal agency provides this certification, the Regional Administrator's designee should certify as to the completeness of the record, as provided in Appendix K.

III. CONTENTS OF THE ADMINISTRATIVE RECORD

A. Remedial Actions

The administrative record for selection of a remedial action should consist of:

- documents which were considered or relied on to select the remedial action; and
- documents which demonstrate the public's opportunity to participate in and comment on the selection of the remedial action.[27]

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[27] See 40 C.F.R. §§300.810 and 300.815.

that the record file should be located in a facility which contains a copying machine (e.g., a public library).

When the administrative record file is available at a facility at or near the site and copying facilities are available there, the lead agency may encourage the requester to make use of the copying facilities at that location. If copying of the record file located at or near the site is difficult for a requesting party, the lead agency may arrange for copying on behalf of a requester at the regional or other central location. The lead agency may ask that requesters arrange for copying by contractors or commercial copy centers who then bill the requester directly.

The lead agency should follow the FOIA regulations at 40 C.F.R. Part 2, in determining the appropriate charge for copying. Copying fees should be waived for other federal agencies, EPA contractors or grantees, and members of Congress. The EPA currently charges $.20 a page for paper copies as provided in 40 C.F.R. Part 2. Reproduction of photographs, microfilms or magnetic tapes, and computer printouts should be charged at the actual cost to the lead agency.

J. Micrographics

The lead agency may make the administrative record file available to the public in microform.[26] Use of micrographics can significantly reduce the space required to store administrative record files. In addition, micrographics can simplify the tasks of reproducing copies of the record file and transmission of the record files to the local repositories. Any use of micrographics should be conducted in an orderly manner consistent with records management procedures. If using micrographics to maintain the record files, the lead agency must provide a micrographic reader at the regional office or other central location to ensure public access to the record file. If a record file is located at or near the site and micrographics are used, the lead agency must ensure that a micrographic reader at that location is available.

Microform copies of original documents are admissable in court if created in an organized fashion. The Business Records as Evidence Act (28 U.S.C. §1732) specifies that copies of records, which are made "in the regular course of business" and copied by any process which accurately reproduces the original, are "as admissible in evidence as the original itself." See also Federal Rules of Evidence 1003. Since the NCP provides for use of microform, microform copies of administrative record documents

[26] See 40 C.F.R. §300.805(c).

Below is a list of documents that are usually generated when a remedial response action is selected. These documents should be included in the administrative record file if they are generated and considered or relied on in selecting the remedial response action. Documents that demonstrate the public's opportunity to participate in and comment on selecting the remedial response action should also be included in the record file. Documents not listed below, but meeting the above criteria, should be included.

Factual Information/Data

- Preliminary Assessment (PA) report;
- Site Investigation (SI) report;
- Remedial Investigation/Feasibility Study (RI/FS) work plan;
- Amendments to the final work plan;
- Sampling and Analysis Plan (SAP): consisting of a quality assurance project plan (QAPP) and a field sampling plan;
- Sampling data: verified data during the RI/FS, or any data collected for previous actions such as RCRA or removal actions which are considered or relied on in selecting the remedial action. Unvalidated data should be included only if relied on in the absence of validated data (see note 9 at page 10);
- Chain of custody forms;
- Inspection reports;
- Data summary sheets;
- Technical studies performed for the site (e.g., a ground-water study);
- Risk evaluation/endangerment assessment and underlying documentation (see section III.C. at page 29);
- Fact sheet or summary information regarding remedial action alternatives generated if special notice letters are issued to PRPs at an early stage of the RI/FS (see "Interim Guidance on Notice Letters, Negotiations, and Information Exchange," October 19, 1987 - OSWER Directive No. 9834.1);
- RI/FS (as available for public comment and as final, if different); and

- Data submitted by the public, including PRPs.

Policy and Guidance

- Memoranda on site-specific or issue-specific policy decisions. Examples include memoranda on off-site disposal availability, special coordination needs (e.g., dioxin), applicable or relevant and appropriate requirements (ARARs) (to the extent not in the RI/FS), cost effectiveness and utilization of permanent solutions and alternative treatment technologies;

- Guidance documents (see section III.I. at page 37); and

- Technical literature (see section III.J. at page 38).

Public Participation (Include the documents that show the public was notified of site activity and had an opportunity to participate in and comment on the selection of response action)

- Community relations plan;

- Newspaper articles showing general community awareness;

- Proposed plan;

- Documents sent to persons on the community relations mailing list and associated date when such document was sent;

- Public notices: any public notices concerning response action selection such as notices of availability of information, notices of meetings and notices of opportunities to comment;

- The community relations mailing list (including all known PRPs);[24]

- Documentation of informal public meetings: information generated or received during meetings with the public and

[24] Individual names and addresses of members of the general public which are on the community relations mailing list should not be included in the public record file. Disclosure of such information may result in a Privacy Act violation (see also section III.H. at page 34) or inhibit the general public from requesting information about the site. The lead agency should then place individual names and addresses in the confidential portion of the record file.

memoranda or notes summarizing significant information submitted during such meetings;

- Public comments: complete text of all written comments submitted (see also section III.D. at page 30);
- Transcripts of formal public meetings: including meetings held during the public comment period on the RI/FS, proposed plan, and any waiver of ARARs under Section 121(d)(4) of CERCLA;
- Responses to significant comments: responses to significant comments received from the public concerning the selection of a remedial action; and
- Responses to comments from the state and other federal agencies.

Enforcement Documents (Include if the document contains information that was considered or relied on in selecting the response selection or shows that the public had an opportunity to participate in and comment on the selection of response action. Do not include enforcement documents solely pertaining to liability)

- Administrative orders;
- Consent decrees;
- Affidavits containing relevant factual information not contained elsewhere in the record file;
- Notice letters to PRPs;
- Responses to notice letters;
- Section 104(e) information request letters and Section 122(e) subpoenas; and
- Responses to Section 104(e) information request letters and Section 122(e) subpoenas.

Other Information

- Index (see section II.D. at page 7);
- Documentation of state involvement: documentation of the request and response on ARARs, Section 121(f)(1)(G) notices and responses, a statement of the state's position on the proposed plan (concurrence, nonconcurrence, or no comment at

the time of publication), opportunity to concur in the selected remedy and be a party to a settlement (see section IV.A. at page 42);

- health assessments, health studies, and public health advisories issued by the Agency for Toxic Substances and Disease Registry (ATSDR)(see section IV.C. at page 45); and

- Natural Resource Trustee notices and responses, findings of fact, final reports and natural resource damage assessments (see section IV.D. at page 45)

Decision Documents

- Record of decision (ROD): remedial action decision document (including responsiveness summary);

- Explanations of significant differences (under Section 117(c)) and underlying information; and

- Amended ROD and underlying information.

The administrative record serves as an overview of the history of the site and should be understandable to the reader. Appendix B provides a model file structure for organizing the record file. Appendix C contains a model index.

B. Removal Actions

The administrative record for selection of a removal action should consist of:

- documents which were considered or relied on to select the removal action; and

- documents which demonstrate the public's opportunity to participate in and comment on the selection of the removal action, when appropriate.[29]

Below is a list of documents that are usually generated when a removal response action is selected. These documents should be included in the administrative record file if they are generated and considered or relied on when selecting the removal action. Documents that demonstrate the public's opportunity to participate in and comment on the removal response action should also be included in the record file. Documents not listed below, but meeting the above criteria, should be included.

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[29] See 40 C.F.R. §§300.810 and 300.820.

Factual Information/Data

- Preliminary assessment (PA) report;
- Site evaluation (SI) report;
- EE/CA (for a non-time-critical removal action);
- Sampling plan;
- Sampling data: verified data obtained for the removal action, or any data collected for previous actions such as RCRA or other response actions which are considered or relied on in selecting the removal action. Unvalidated data should be included only if relied on in the absence of validated data (see note 9 at page 10);
- Chain of custody forms;
- Inspection reports;
- Technical studies performed for the site (e.g., a ground water study);
- Risk evaluation/endangerment assessment and underlying documentation; and
- Data submitted by the public, including PRPs.

Policy and Guidance

- Memoranda on site-specific or issue-specific policy decisions. Examples include memoranda on off-site disposal availability, compliance with other environmental statutes, special coordination needs (e.g., dioxin);
- Guidance documents (see section III.I. at page 37); and
- Technical literature (see section III.J. at page 38).

Public Participation (Include the documents that show the public was notified of site activity and had an opportunity to participate in the response selection.)

- Community relations plan;
- Newspaper articles showing general community awareness;
- Documents sent to persons on the community relations mailing list and associated date when such documents was sent;

- Public notices: any public notices concerning response action selection such as notices of availability of information, notices of meetings, and notices of opportunities to comment;
- The community relations mailing list (including all known PRPs);[30]
- Documentation of public meetings: information generated or submitted during meetings with the public (including PRPs) and memoranda or notes summarizing significant information submitted during such meetings;
- Public comments: complete text of all written comments submitted (see section III.D. at page 30);
- Responses to significant comments: responses to significant comments received from the public concerning the selection of a removal action; and
- Responses to comments from states and other federal agencies.

Enforcement Documents (Include if the document contains information that was considered or relied on in selecting the response selection or shows that the public had an opportunity to participate in and comment on the selection of response action. Do not include enforcement documents solely pertaining to liability)

- Administrative orders;
- Consent decrees;
- Affidavits containing relevant factual information not contained elsewhere in the record file;
- Notice letters to PRPs;

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[30] Individual names and addresses of members of the general public which are on the community relations mailing list should not be included in the public record file. Disclosure of such information may result in a Privacy Act violation (see also section III.H. at page 34) or inhibit the general public from requesting information about the site. The lead agency should then place individual names and addresses in the confidential portion of the record file.

- Responses to notice letters;
- Section 104(e) information request letters and Section 122(e) subpoenas; and
- Responses to Section 104(e) information request letters and Section 122(e) subpoenas.

Other Information

- Index (see section II.D. at page 7);
- Documentation of state involvement (see section IV.A. at page 42);
- ATSDR health assessments, health studies, and public health advisories (see section IV.C. at page 45); and
- Natural Resource Trustee notices and responses, findings of fact, final reports and natural resource damage assessments (see IV.D. at page 45).

Decision Documents

- EE/CA Approval Memorandum;
- Action Memorandum;
- Amended Action Memorandum; and
- Other documents which embody the decision for selection of a removal action.

The administrative record serves as an overview of the history of the site and should be understandable to the reader. Appendix B provides a model file structure for organizing the record file. Appendix C contains a model index.

C. Imminent and Substantial Endangerment

Under Section 106 of CERCLA, the EPA may find the existence of an imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release of a hazardous substance.

Determining the existence of an imminent and substantial endangerment is an important component in selecting the response action. Therefore, all documents considered or relied on in making that determination, including any risk assessment, and its supporting documentation, must be included in the administrative

record file.[31] If there is proper documentation of the determination of an imminent and substantial endangerment in the record file, judicial review of that determination in an action under Section 106 of CERCLA should be limited to the administrative record.

D. Public Comments

The administrative record file should document the public's opportunity to be involved in selecting a response action. This can be accomplished by including in the record file all documents related to the opportunity to participate (e.g., notices and fact sheets), and relevant written comments and information submitted by the public (e.g., reports and data).

Public requests for information (e.g., Freedom of Information Act (FOIA) requests for copies of reports), need not be included in the record file.

The lead agency should request that substantive oral comments (either in person or over the phone) be put in writing by the commenter and submitted to the record file. The commenter should be advised that the obligation to reduce the comment to writing rests with the commenter. The lead agency, however, may reduce it to writing where the lead agency will want to rely on the comment.

The lead agency may respond to comments received prior to a public comment period in various ways, depending on the nature and relevance of a particular comment. The lead agency's consideration of such a comment may be in the form of a written response, or reflected by documented actions taken after receiving the comment, or even by changes in subsequent versions of documents. If the lead agency prepares a written response to a comment, the comment and response should be included in the record file.

The lead agency may notify commenters that comments submitted prior to a formal public comment period must be resubmitted or specifically identified during the public comment period in order to receive formal response by the lead agency. Alternatively, the lead agency may notify a commenter that the lead agency will respond to the comment in a responsiveness summary prepared at a later date. The lead agency, however, has

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[31] See "Guidance on Preparing Superfund Decision Documents: The Proposed Plan, The Record of Decision, Explanation of Significant Differences, ROD Amendment," OSWER Directive No. 9355.3-02, June 1989.

no duty to respond to any comments received before the formal public comment period, or to respond to comments during the public comment period until the close of the public comment period.

The lead agency, however, is encouraged to consider, respond to and include in the record file significant comments that were submitted before the public comment period. Considering early comments provides practical benefits both substantively and procedurally. Early comments may provide important information for the selection decision, and early consideration provides the public (and, particularly, PRP's) with additional informal opportunities for participating in the decision making process.[32]

All comments received by the lead agency during the formal public comment period are to be included in the record file in their original form, or if not feasible, an explanation should be placed in the record file explaining why such comments were not included. Comments received during the formal public comment period must be addressed in the responsiveness summary (included with the ROD in remedial response actions). The responses may be combined by subject or other category in the record file.

Comments which are received after the formal comment period closes and before the decision document is signed should be included in the record file but labeled "late comment." Such comments should be handled as post-decision information (see section III.N. at page 40).

Comments received after the decision document is signed should be placed in a post-decision document file. They may be added to the record file in limited circumstances (see section III.N. at page 40).

E. Enforcement Actions

The same procedures should be used for establishing an administrative record whether or not a response action is selected in the context of an enforcement action. The following additional information, however, may assist the lead agency where there is enforcement activity.

E.1. Negotiation Documents

During negotiations with the lead agency, a potentially responsible party (PRP) may produce documents and claim that they

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[32] See 40 C.F.R. §§300.815(b), 300.825(a)(2) and (b)(2).

constitute confidential business information (CBI) or offers of settlement subject to Rule 408 of the Federal Rules of Evidence.

Generally, those documents are not part of the administrative record for response selection unless they are submitted by PRPs for consideration in selecting a response action and are considered or relied on in selecting the response action. A privileged document which was considered or relied on in selecting the response action should be placed in the confidential portion of the record file. Such a document should be summarized and the summary included in the publicly accessible portion of the record file (see section II.H. at page 19). If the information cannot be summarized in a disclosable manner, the information should be placed in the confidential portion of the record file only and listed in the index to the file.

E.2. PRP-Lead RI/FS

Where a PRP is conducting the RI/FS, the PRP must submit all technical information on selection of the remedial action generated during the RI/FS to the lead agency. Technical information includes work plans, sampling data, reports, and memoranda. The lead agency, and not the PRP, will establish and maintain the administrative record file (see "Interim Guidance on Potentially Responsible Party Participation in Remedial Investigations and Feasibility Studies," May 16, 1988, OSWER Directive No. 9835.1a and "Model Administrative Order on Consent for Remedial Investigation and Feasibility Study," January 30, 1990, OSWER Directive No. 9835.10.)

PRPs may be delegated responsibility for some record file maintenance activities, such as housing the files at or near the site. PRPs cannot, however, be responsible for decisions on what documents comprise the record file, because of, among other things, the potential for a conflict of interest.

E.3. Administrative Orders and Consent Decrees

Final administrative orders and consent decrees issued prior to selection of the response action (e.g., ordering a PRP to conduct the RI/FS), should be included in the administrative record file. Administrative orders or consent decrees issued after the signing of the ROD or the action memorandum should not be included in the record file, unless the consent decree or administrative order meets the criteria for the inclusion of post-decision documents in the record file (see section III.N. at page 40). Drafts of administrative orders and consent decrees should not be included in the record file, unless the drafts contain factual information that was considered or relied on and is not found elsewhere in the record file.

The issues relating to administrative records for administrative orders and de minimis settlements are not addressed by this guidance.

F. Excluded Documents

Certain documents should not be included in the administrative record file because they are irrelevant to the selection of the response action. Documents should be excluded from the record file if they were not considered or relied on in selecting the response action.

Material beyond the scope of the record file should be kept in separate files maintained at the regional office or other central location. These files need not be made publicly available, although many of the documents in the files may be available to the public if requested under FOIA.

Examples of documents that are irrelevant to the decision on selecting a response action may include Hazard Ranking System (HRS) scoring packages, contractor work assignments, cost documentation (as opposed to cost effectiveness information), and National Priorities List (NPL) deletion information. If, however, these documents contain information that is considered or relied on in the response action selection and is not contained elsewhere in the record file, then the documents should be included in the record file.

Information regarding PRP liability is generally not included in the record file for selection of the response action except to the extent such information (typically substance specific) is considered or relied on in selecting the response action. Documents relating to PRP liability, however, should be compiled and maintained in the regional office or other central location so that they are available at the time of notice to PRPs or referral of any litigation.

G. Draft Documents and Internal Memoranda

In general, only final documents should be included in the administrative record file. The record file should not include preliminary documents such as drafts and internal memoranda. Such documents are excluded from the record file because drafts and internal memoranda are often revised or superseded by subsequent drafts and memoranda prior to the selection of the response action. The preliminary documents are, therefore, not considered or relied on in making the response action decision.

Drafts (or portions of them) and internal memoranda should be included, however, in three instances. First, if a draft

document or internal memorandum is the basis for a response decision the draft document or internal memorandum should be placed in the record file. This may occur if the draft contains factual information which was relied on but is not included in a final document, a final document does not exist, or a final document did not exist when the response decision was made.

Second, if a draft document or internal memorandum is circulated by the lead agency to other persons (e.g., the support agency, PRPs or the general public) who then submit comments which the decisionmaker considers or relies on when making a response action decision, relevant portions of the draft document or the memorandum and comments on that document should be included in the record file.

Third, if a draft document or internal memorandum explains or conveys decisions on the procedures for selecting the remedy or the substantive aspects of a proposed or selected remedy (e.g., the scope of a site investigation or the identification of potential ARARs), the document should be placed in the record file, even though the document was signed by a person other than the Regional Administrator and generated long before the decision document was signed.

Examples of internal memoranda and staff notes which should not be included in the record file are documents that express tentative opinions or internal documents that evaluate alternative viewpoints. Recommendations of staff to other staff or management should also not be included in the record file, except for those staff recommendations which ultimately embody a final decision relevant to response selection. Drafts and internal memoranda may also be subject to claims of privilege (see section III.H., below).

H. Privileged Documents

Some documents in the administrative record file may be protected from public disclosure on the basis of an applicable privilege.[33] Any documents which are considered or relied on in a response action selection, but withheld from the public portion of the record file based on privilege, must be placed in a confidential portion of the record file (see section II.H. at page 19).

If a document is excluded from the public portion of the record file based on privilege, the relevant information should, to the extent feasible, be extracted and included in the public

[33] See 40 C.F.R. §300.810(c).

record file. This can often be accomplished by deleting or redacting the privileged information from the document.

The privileges discussed below may be asserted with respect to documents that are considered or relied on in the selection of a response action. The head of the office responsible for developing the document in question should assert the privilege. In all cases, the official asserting a privilege should consult with ORC.

Public disclosure of a privileged document may result in waiver of the privilege, although the nature and extent of the waiver will depend on the privilege asserted and the circumstances of the disclosure. If the privilege is waived and the document becomes a public document, it must be disclosed to any requester. In light of the potential for waiver, it is important that personnel not release potentially privileged documents to any party without consulting with ORC.

Deliberative Process

The deliberative process privilege applies to pre-decisional, deliberative communications that express opinions, advice, and recommendations of staff to other staff or management. The privilege functions to encourage the honest and free expression of opinion, suggestions and ideas among those formulating policy for government agencies (see "Guidance for Assertion of Deliberative Process Privilege," 10/3/84).

In general, if a document contains factual information forming the basis for the selection of the response action, the factual portion should be included in the record file.

Use of the deliberative process privilege should be balanced with the statutory mandate of including the public in the response action selection process. The privilege should be asserted if disclosure of the document will have an inhibiting effect on frank and open discussion among government staff and decisionmakers. Documents should not be withheld solely because they would reveal flaws in the case or information embarrassing to the government. Specific procedures exist for assertion of the deliberative process privilege, which include consulting with ORC.

Confidential Business Information (CBI)

The EPA must withhold from the public record trade secrets and commercial and financial information that is subject to protection under 40 C.F.R. Part 2. However, Section 104(e)(7) of CERCLA greatly restricts the assertions of confidentiality claims

by PRPs at CERCLA sites. The decisionmaker should attempt to avoid using CBI in making response action decisions and can do so in most cases by using other information instead.[34] Where the decisionmaker must use CBI in making its decision, 40 C.F.R. Part 2 and Section 104(e)(7) of CERCLA will apply and such information should be placed in the confidential portion of the administrative record file.

Attorney Work Product

This exclusion applies to documents prepared in anticipation of possible litigation. The work product privilege covers all documents prepared by an attorney or under an attorney's supervision, including reports prepared by a consultant or program employee. Litigation need not have commenced but it must be reasonably contemplated. These documents generally relate to enforcement or defensibility of a decision and are not considered or relied on in selecting a response action. These documents should not, therefore, be in the administrative record file.

Attorney-Client Communication

The attorney-client privilege applies to confidential communications made in connection with securing or rendering legal advice. The privilege is limited to communications where there was an intention to keep the information confidential.

Personal Privacy

This exemption covers information about individuals in personnel, medical, and similar files, the disclosure of which would constitute a clearly unwarranted invasion of personal privacy. The records must pertain to an individual, and not a business, to be excluded from the public portion of the administrative record file under this exemption. Often, information subject to the protection under the personal privacy privilege can be redacted from the document and the redacted version can be placed in the public portion of the record file.

State Secrets

The lead agency is authorized to exclude from public scrutiny information which, if released, would harm national security or interfere with the government's ability to conduct foreign relations. This privilege could be particularly important where the PRP is a federal agency or a contractor for a federal agency. In the case of a federal facility cleanup, an

[34] See 40 C.F.R. §300.810(d).

Inter-Agency Agreement should spell out procedures for asserting this privilege.

Confidential Informant

Statements obtained from witnesses who have been granted confidentiality may be privileged.

Information Exempted by Other Statutes

Information specifically exempted from disclosure by a federal statute need not be part of the public record. The statute in question must leave no discretion as to the requirement that matters be withheld from the public, or it must establish particular criteria for withholding or refer to particular types of matters to be withheld.

I. Guidance Documents

Guidance documents, or portions of guidance documents, that are considered or relied on in selecting a response action should be included in the administrative record file for that response action. Any guidance documents generated to address issues that specifically arise at the site for which the record file is being compiled should be physically included in the record file. Certain guidance documents, however, do not have to be kept in the record file. *Guidance documents not generated for* the particular site for which the record is being compiled may be kept in a compendium of guidance documents maintained at the regional office or other central location.[35]

Each Region should maintain a compendium of guidance documents which are frequently used in selecting response actions. As with an administrative record file, the compendium of guidance documents must be available to the public, but only at the regional office or other central location. The record file located at or near the site should contain an index to the compendium of guidance documents. The Administrative Record Coordinator should maintain and update the compendium of guidance documents. If a guidance document maintained in the compendium is considered or relied on when making a response action decision, the index to the record file must list the document and indicate its location and availability. See also Appendix E.

If a guidance document is listed in a bibliography to a document included in the record file (e.g., listed in the bibliography to the RI/FS), it need not be listed again in the

[35] See 40 C.F.R. §300.805(a)(2).

index to the record file. In this case, however, the index must state that documents listed as bibliographic sources might not be listed separately in the index.

If a guidance document which is not included in the guidance compendium is considered or relied on in selecting the response action, the document should be physically included in the record file.

J. Technical Literature

Technical literature generated for the site at issue should be physically included in the administrative record file for that site, whether or not it is publicly available.

Similarly, technical literature not specifically generated for the site which is not publicly available should also be included in the site-specific record file. Such documents include technical journals and unpublished documents that are not available through the Library of Congress or not circulated to technical libraries.

Publicly available technical literature not generated for the site, however, need not be located at or near the site or at the regional office or other central location if the documents are referenced in the index to the record file.[34] These documents do not have to be physically included in the record file, unless requested, because they are already available to the public. Copying such documents creates a significant burden to the lead agency and copyright laws may pose additional barriers to such copying. Examples of publicly available technical literature include engineering manuals, groundwater monitoring or hydrogeology textbooks, ATSDR toxicological profiles, and articles from technical journals.

If technical literature is listed in a bibliography to a document included in the record file (e.g., listed in the bibliography to the RI/FS), it need not be listed again in the index to the record file. In this case, however, the index must state that documents listed as bibliographic sources might not be listed separately in the index.

Computer models and technical databases need not be physically included in the record file but should be referenced in the index to the record file and made available upon request. Printouts or other documents produced from the models and databases should be physically included in the record file if

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[34] See 40 C.F.R. §300.805(b)(3).

such documents contain information which was considered or relied on in selecting the response action.

K. Legal Sources

Copies of statutes and regulations cited in documents included in the record file need not be included in the record file if they are readily available to the public. For example, the NCP and other regulations are easily accessible since they are published in the Federal Register and the Code of Federal Regulations (C.F.R.).

Copies of the actual standards (statutes or regulations) comprising federal and state ARARs should be physically included in the record file if they are not easily accessible. Also, other federal and state criteria, advisories, and guidance documents pertinent to the site (e.g., what the EPA refers to as "TBCs," or standards "to be considered"), may not be easily accessible. If such documents are cited in an RI/FS, appendix to the RI/FS, EE/CA, or ROD, those advisories which are not readily available should be included in the record file.

L. NPL Rulemaking Docket Information

Generally, information included in the National Priorities List (NPL) rulemaking docket, such as the Hazard Ranking System (HRS) scoring package and comments received on the listing, need not be included in the record file for selection of a response action. The NPL docket contains information relevant to the decision to list a site, which may be irrelevant to the decision on response action selection.

Documents in the NPL docket which contain sampling data or other factual information which was considered or relied on in selecting a response action should be included in the record file if the information is not available already in the record file. Such information may include early sampling data taken by parties other than the lead agency or its contractors (e.g., a State).

M. RCRA Documents

If an action is taken under CERCLA at a site with a history of Resource Conservation and Recovery Act (RCRA) activity, much of the information relating to those RCRA activities may be considered or relied on in making the CERCLA response action selection. Any relevant RCRA information, particularly information on waste management and RCRA corrective action at the site, should be included in the administrative record file (e.g., RCRA permit applications, inspection reports, RCRA Facility Assessment (RFA), RCRA Facility Investigation (RFI), Corrective

Measures Studies (CMS), or responses to RCRA information requests).

Not all pre-existing RCRA information will be considered or relied on in selecting a CERCLA response action, but information on types of wastes, quantity of wastes, and observations of potential threats gathered during RCRA investigations generally will be considered and thus should be included in the record file.

N. Post-Decision Information

In all cases, documents generated or received after signing the decision document should be kept in a post-decision document file. This file is not part of the administrative record file and should be maintained only at the regional office or other central location.

In general, post-decision documents should not be added to the administrative record file. Since the record file contains the information which was considered or relied on in selecting the response action, documents generated or received after selecting the response action are not relevant to that response decision and should not be included in the record file. Such documents may, however, be relevant to later response selection decisions and, if so, should be included in the record file pursuant to Section 300.825 of the NCP.

Documents kept in the post-decision document file may be added to the record file in the situations described below:

- Where a decision document does not address or reserves a portion of the decision to be made at a later date.[37] For example, a decision document that does not resolve the type of treatment technology. In such cases, the lead agency should continue to add documents to the record file which form the basis for the unaddressed or reserved portion of the decision;

- Where there is a significant change in the selected response action.[38] Changes that result in a significant difference to a basic feature of the selected remedial action (e.g., timing, ARARs), with respect to scope, performance, or cost

[37] 40 C.F.R. §300.825(a)(1).

[38] 40 C.F.R. §300.825(a)(2). See 40 C.F.R. §300.435(c)(2)(i).

may be addressed in an explanation of significant differences. Section 117(c) of CERCLA states:

> [a]fter adoption of a final remedial action plan - (1) if any remedial action is taken, (2) if any enforcement action under section 106 is taken, or (3) if any settlement or consent decree under section 106 or section 122 is entered into, and if such action, settlement, or decree differs in any significant respects from the final plan, the President or the State shall publish an explanation of the significant differences and the reasons such changes were made.

The record file should include the explanation of significant differences, underlying documentation for the response action changes, any significant comments from the public, and the lead agency responses to any significant comments. A formal public comment period is not required for an explanation of significant differences;

- Where the changes are so significant that they fundamentally alter the very nature or basis of the overall response action. Such changes will require an amended decision document.[39] The Region will decide whether a change to a response action is considered a significant or a fundamental change for purposes of addressing the change (see Chapter 8 of "Interim Final Guidance on Preparing Superfund Decision Documents: The Proposed Plan and Record of Decision," June 1989, OSWER Directive No. 9355.3-02).

  When the decision document is amended, the amended decision document, the underlying documentation, any significant comments from the public, and the lead agency's responses to any significant comments, should be included in the record file. ROD amendments will require a formal public comment period;[40]

- Where comments containing significant information are submitted by interested persons after the close of the public comment period. The lead agency must consider such comments only to the extent that the comments contain significant information not contained elsewhere in the record file which could not have been submitted during the public comment period and which substantially support the

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[39] 40 C.F.R. §300.825(a)(2).

[40] 40 C.F.R. §300.435(c)(2)(ii).

need to significantly alter the response action.[41] Documents meeting this test should be included in the record file, along with the lead agency's responses to the significant comments, whether or not such information results in a change to the selected decision. In this case, the comments and the lead agency responses to such comments, including any supporting documents, should be included in the record file; and

- Where the lead agency holds public comment periods after the selection of the response action.[42] The lead agency may hold additional public comment periods or extend the time for submission of public comment on any issue concerning response selection. Such comment should be limited to the issues for which the lead agency requested additional comment. All comments responsive to the request submitted during such comment periods, along with any public notices of the comment period, transcripts of public meetings, and lead agency responses to the comments, should be placed in the record file.

IV. INVOLVEMENT OF OTHER PARTIES

A. States

A.1. State Involvement in Federal-Lead Sites

The administrative record for a federal-lead site must reflect the state's opportunity to be involved in selecting the response action. The record for a remedial action should include documents that reflect at least the following state participation or the opportunity for state participation:[43]

- Letter to state requesting identification of ARARs and the final response from state identifying ARARs (and certification from the state);

- Comments, or the opportunity to comment, on a proposed finding or decision to select a response action not attaining a level or standard of control at least equivalent to a state ARAR;

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[41] 40 C.F.R. §300.825(c).

[42] 40 C.F.R. §300.825(b).

[43] See also Section 121(f) of CERCLA

- Comments, or the opportunity to comment, on the final draft RI/FS, the proposed plan and EPA responses to the comments;

- Significant post-decision comments by the state and EPA responses to the comments (place in the post-decision document file for possible inclusion in the record file - see section III.N. at page 40).

The administrative record for a removal action should reflect any state participation, especially any state comments and EPA responses to the comments.

The record file should only include final state comments, unless the comments explain or convey decisions on substantive aspects of a proposed or selected remedy (e.g., the scope of a proposed action or the identification of potential ARARs). Any preliminary deliberations between the state and EPA relevant to the response selection need not be part of the record file if superseded by documentation of the state's final position.

The governing body of an Indian tribe should be afforded the same treatment as a state in accordance with Section 126 of CERCLA.

A.2. Federal Involvement in State-Lead Sites

Where a state has been officially designated the lead agency for a CERCLA site, the state must compile and maintain the administrative record for that site in accordance with Section 113(k) of CERCLA and Section 300.800 of the NCP. Since EPA has ultimate responsibility for both the selection of a response action (e.g., EPA signs the ROD) and the record on which that response action is based, EPA must participate in compiling and maintaining the record. In such cases, EPA must assure that the record file forms a complete basis for the selection of the response action.

The state as lead agency must maintain the record file at a state office (e.g., the state's central environmental agency office) and at or near the site. At a minimum, the state as lead agency also must transmit a copy of the index, the RI/FS work plan, the RI/FS released for public comment, the proposed plan, and any public comments received on the RI/FS and the proposed plan to the appropriate EPA Regional office.[44] These documents should be transmitted to EPA as they are generated or received. Transmittal of the index will not suffice. In addition, other documents may be requested by EPA on a case-by-case basis.

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[44] See 40 C.F.R. §300.800(c).

The Superfund Memorandum of Agreement (SMOA), or Cooperative Agreement (CA), must address the administrative record requirements. The following language should be included in the SMOA or CA where the state has been officially designated the lead agency for a CERCLA site:

> The state must compile and maintain the administrative record upon which the selection of the [remedial, removal] action is based. The compilation and maintenance of the record must follow 40 C.F.R. Part 300, Subpart I and EPA guidance on the administrative record. The administrative record must be located at the state [environmental agency] office, and at or near the site. In addition, the state must submit copies of the index, the RI/FS workplan, the RI/FS released for public comment, the proposed plan, and any public comments received on the RI/FS and proposed plan to the EPA Regional office, as they are added to the administrative record file. In addition, the state must submit other documents that are requested by EPA. The state shall comply with Section 113 of CERCLA and any applicable regulations. EPA may require the retention of other documents for cost recovery purposes.

The record file compiled by the state should reflect EPA's participation, comments, concurrence, and disagreements at the same stages as are required for state involvement in a federal-lead site. The state must place in the record file any documents submitted by EPA for inclusion in the record file.

B. Federal Facilities

Federal agencies have the responsibility, pursuant to Executive Order 12580, to establish the administrative record for federal facilities under their jurisdiction, custody, or control where using CERCLA authority for a response action. The record file for a federal facility must include all documents considered or relied on in selecting a response action, including documents submitted by EPA on the selection of the response action. The federal agency must comply with all NCP (see Appendix M) and CERCLA requirements in compiling and maintaining the record, including the minimum public participation requirements in Sections 113 and 117 of CERCLA.[45]

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[45] See 40 C.F.R. §300.800(b).

The federal agency must maintain the record file at or near the site and ensure easy public access to the record file. If, for example, a site is a Department of Defense facility, the record file should be housed in a location which does not require military clearance for access. The federal agency should keep a complete copy of the record file at a location within the federal agency office comparable to an EPA Regional office.

At NPL sites and any other site where EPA is involved in selecting a response action at a federal facility, EPA must participate in compiling and maintaining the record. In such cases, EPA must assure that the record file forms a complete basis for the selection of the response action. At a minimum, the federal agency must transmit a copy of the index, the RI/FS workplan, the RI/FS released for public comment, the proposed plan, and any public comments received on the RI/FS and proposed plan to the appropriate EPA Regional office. These documents should be transmitted to EPA as they are generated. Transmittal of the index will not suffice. In addition, other documents may be requested by EPA on a case-by-case basis. Inter-Agency Agreements (IAGs) should spell out procedures for compiling and maintaining the record.

C. ATSDR

Participation in the selection of a response action by the Agency for Toxic Substance and Disease Registry (ATSDR) should be reflected in the administrative record. The record file must include the initial and subsequent health assessments and any other information EPA solicits and obtains from ATSDR which EPA considers or relies on in its selection of a response action.

Draft versions of the health assessment and other draft documents upon which ATSDR comments should not be included in the record file. If, however, EPA solicits comments from ATSDR on a draft document such as a draft work plan or RI report, and receives formal comments from ATSDR which EPA considers or relies on in selecting a response action, then the document and comments should be included in the record file.

In the event that the ATSDR health assessment and EPA's risk assessment appear inconsistent, a document explaining the difference should be generated and placed in the record file.

D. Natural Resources Trustees

Section 122(j)(1) of CERCLA requires that the EPA give notice to the Natural Resources Trustee of a release or threatened release of any hazardous substance which may have resulted in damages to natural resources. The administrative

record file must include the notice to the Natural Resources Trustee, and any subsequent final communications (e.g., a release or final report). In addition, any factual information provided by the Natural Resources Trustee which is considered or relied on in selecting a response action should be included in the record file.

In the event that the Natural Resources Trustee's damage assessment and EPA's risk assessment appear inconsistent, a document explaining the difference should be generated and placed in the record file.

V. DISCLAIMER

The policies and procedures established in this document are intended solely for the guidance of employees of the U.S. Environmental Protection Agency. They are not intended and cannot be relied upon to create any rights, substantive or procedural, enforceable by any party in litigation with the United States. EPA reserves the right to act at variance with these policies and procedures and to change them at any time without public notice.

VI. FURTHER INFORMATION

For further information concerning this memorandum, please contact Gary Worthman in the Office of Waste Programs Enforcement at FTS (202) 382-5646.

GLOSSARY

Administrative Record: as used in this guidance, the body of documents that were considered or relied on which form the basis for the selection of a response action.

Administrative Record File: as used in this guidance, the ongoing collection of documents which are anticipated to constitute the administrative record when the selection of response action is made.

ARAR: applicable or relevant and appropriate requirements (see Section 121(d) of CERCLA).

ATSDR: Agency for Toxic Substance and Disease Registry.

CA: cooperative agreement (entered into with a state or local government to transfer funds to conduct response activities).

CBI: confidential business information.

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (also known as Superfund).

C.F.R.: Code of Federal Regulations.

CMS: corrective measure study (RCRA corrective action document, equivalent to an FS).

CRC: Community Relations Coordinator.

CRP: community relations plan.

Document: as used in this guidance, includes writings, drawings, graphs, charts, photographs, and data compilation from which information can be obtained. It does not, however, include physical samples.

DOJ: Department of Justice.

EE/CA: engineering evaluation/cost analysis (removal document).

EPA: United States Environmental Protection Agency.

ESD: Environmental Services Division.

Explanation of Significant Differences: post-ROD document described in Section 117(c) of CERCLA.

FOIA: Freedom of Information Act.

FSP: field sampling plan.

HRS: Hazard Ranking System.

IAG: inter-agency agreement (made with a federal agency).

Lead Agency: the agency that provides the OSC or RPM to plan and implement a response action under the NCP.

NCP: National Oil and Hazardous Substances Pollution Contingency Plan, as revised on March 8, 1990 (55 FR 8859).

NPL: National Priorities List.

OE: EPA Office of Enforcement.

OERR: EPA Office of Emergency and Remedial Response.

OIRM: EPA Office of Information Resources Management.

Operable Unit: a discrete action that comprises an incremental step toward comprehensively addressing site problems (see section 300.5 of the NCP).

ORC: EPA Office of Regional Counsel.

OSC: On-Scene Coordinator (project manager for a removal action)

OSWER: EPA Office of Solid Waste and Emergency Response.

OWPE: EPA Office of Waste Programs Enforcement.

PA: preliminary assessment.

PRP: potentially responsible party.

QAPP: quality assurance project plan.

RA: remedial action.

RCRA: the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act.

RD: remedial design.

RI/FS: remedial investigation/feasibility study.

RFA: RCRA facility assessment (RCRA document, equivalent to a PA/SI).

RFI: RCRA facility investigation (RCRA corrective action document, equivalent to an RI).

ROD: Record of Decision (documents the selection of a remedial action).

RPM: remedial project manager (project manager for a remedial action).

SAP: sampling and analysis plan.

SARA: Superfund Amendments and Reauthorization Act of 1986 (see CERCLA above).

Site File: the file containing all site documentation.

SI: site investigation.

SMOA: Superfund memorandum of agreement (made with a state).

Support Agency: the agency that provides the support agency coordinator to furnish necessary data to the lead agency, review response data and documents, and provide other assistance as requested by the lead agency. The support agency may also concur on decision documents.

APPENDIX A

SECTION 113 (J) OF CERCLA

(j) JUDICIAL REVIEW.—

(1) LIMITATION.—In any judicial action under this Act, judicial review of any issues concerning the adequacy of any response action taken or ordered by the President shall be limited to the administrative record. Otherwise applicable principles of administrative law shall govern whether any supplemental materials may be considered by the court.

(2) STANDARD.—In considering objections raised in any judicial action under this Act, the court shall uphold the President's decision in selecting the response action unless the objecting party can demonstrate, on the administrative record, that the decision was arbitrary and capricious or otherwise not in accordance with law.

(3) REMEDY.—If the court finds that the selection of the response action was arbitrary and capricious or otherwise not in accordance with law, the court shall award (A) only the response costs or damages that are not inconsistent with the national contingency plan, and (B) such other relief as is consistent with the National Contingency Plan.

(4) PROCEDURAL ERRORS.—In reviewing alleged procedural errors, the court may disallow costs or damages only if the errors were so serious and related to matters of such central relevance to the action that the action would have been significantly changed had such errors not been made.

(k) ADMINISTRATIVE RECORD AND PARTICIPATION PROCEDURES.—

(1) ADMINISTRATIVE RECORD.—The President shall establish an administrative record upon which the President shall base the selection of a response action. The administrative record shall be available to the public at or near the facility at issue. The President also may place duplicates of the administrative record at any other location.

(2) PARTICIPATION PROCEDURES.—

(A) REMOVAL ACTION.—The President shall promulgate regulations in accordance with chapter 5 of title 5 of the United States Code establishing procedures for the appropriate participation of interested persons in the development of the administrative record on which the President will base the selection of removal actions and on which judicial review of removal actions will be based.

(B) REMEDIAL ACTION.—The President shall provide for the participation of interested persons, including potentially responsible parties, in the development of the administrative record on which the President will base the selection of remedial actions and on which judicial review of remedial actions will be based. The procedures developed under this subparagraph shall include, at a minimum, each of the following:

(i) Notice to potentially affected persons and the public, which shall be accompanied by a brief analysis of the plan and alternative plans that were considered.

(ii) A reasonable opportunity to comment and provide information regarding the plan.

(iii) An opportunity for a public meeting in the affected area, in accordance with section 117(a)(2) (relating to public participation).

(iv) A response to each of the significant comments, criticisms, and new data submitted in written or oral presentations.

(v) A statement of the basis and purpose of the selected action.

For purposes of this subparagraph, the administrative record shall include all items developed and received under this subparagraph and all items described in the second sentence of section 117(d). The President shall promulgate regulations in accordance with chapter 5 of title 5 of the United States Code to carry out the requirements of this subparagraph.

(C) INTERIM RECORD.—Until such regulations under subparagraphs (A) and (B) are promulgated, the administrative record shall consist of all items developed and received pursuant to current procedures for selection of the response action, including procedures for the participation of interested parties and the public. The development of an administrative record and the selection of response action under this Act shall not include an adjudicatory hearing.

(D) POTENTIALLY RESPONSIBLE PARTIES.—The President shall make reasonable efforts to identify and notify potentially responsible parties as early as possible before selection of a response action. Nothing in this paragraph shall be construed to be a defense to liability.

APPENDIX B

MODEL FILE STRUCTURE

This model file structure may be used to compile an administrative record file for a remedial action, a removal action, or a combination of both remedial and removal actions. If the record documents a remedial action decision, section 2 of the file will contain only those removal action documents which (a) predate the remedial record of decision and (b) are relevant to the selection of the remedial action. If the record documents a removal action decision, sections 3, 4, and 5 of the file will contain only those remedial action documents which (a) predate the removal action memorandum and (b) are relevant to the selection of the removal action.

Justification is unnecessary for file categories without any documents. Those categories should be left out of the index.

A document should be filed in only one category, even if it falls into more than one category. It may be referenced in another category. If necessary, additional subcategories may be developed to accommodate documents not falling in any of the defined subcategories. Avoid adding categories of miscellaneous documents.

The correspondence subcategory can include comments and responses specific to the category. If the comments and responses are general in nature or address more than one category, they may be included in the public participation category.

INDEX (FIRST DOCUMENT)

1.0 SITE IDENTIFICATION
- 1.1 Background - RCRA and other information
- 1.2 Notification/Site Inspection Reports
- 1.3 Preliminary Assessment (PA) Report
- 1.4 Site Investigation (SI) Report
- 1.5 Previous Operable Unit Information

2.0 REMOVAL RESPONSE
- 2.1 Sampling and Analysis Plans
- 2.2 Sampling and Analysis Data/Chain of Custody Forms
- 2.3 EE/CA Approval Memorandum (for non-time-critical removals)
- 2.4 EE/CA
- 2.5 Action Memorandum
- 2.6 Amendments to Action Memorandum

3.0 REMEDIAL INVESTIGATION (RI)
- 3.1 Sampling and Analysis Plan (SAP)
- 3.2 Sampling and Analysis Data/Chain of Custody Forms
- 3.3 Work Plan
- 3.4 RI Reports

4.0 FEASIBILITY STUDY (FS)
- 4.1 ARAR Determinations
- 4.2 FS Reports
- 4.3 Proposed Plan
- 4.4 Supplements and Revisions to the Proposed Plan

5.0 RECORD OF DECISION (ROD)
- 5.1 ROD
- 5.2 Amendments to ROD
- 5.3 Explanations of Significant Differences

6.0 STATE COORDINATION
- 6.1 Cooperative Agreements/SMOAs

6.3 State Certification of ARARs

7.0 ENFORCEMENT

7.1 Enforcement History

7.2 Endangerment Assessments

7.3 Administrative Orders

7.4 Consent Decrees

7.5 Affidavits

7.6 Documentation of Technical Discussions with PRPs on Response Actions

7.7 Notice Letters and Responses

8.0 HEALTH ASSESSMENTS

8.1 ATSDR Health Assessments

8.2 Toxicological Profiles

9.0 NATURAL RESOURCE TRUSTEES

9.1 Notices Issued

9.2 Findings of Fact

9.3 Reports

10.0 PUBLIC PARTICIPATION

10.1 Comments and Responses

10.2 Community Relations Plan

10.3 Public Notice(s) (Availability of the Administrative Record File, Availability the Proposed Plan, Public Meetings)

10.4 Public Meeting Transcripts

10.5 Documentation of Other Public Meetings

10.6 Fact Sheets and Press Releases

10.7 Responsiveness Summary

10.8 Late Comments

11.0 TECHNICAL SOURCES AND GUIDANCE DOCUMENTS

11.1 EPA Headquarters Guidance

11.2 EPA Regional Guidance

11.3 State Guidance

11.4 Technical Sources

APPENDIX C

MODEL INDEX

Attached is an excerpt of the Index of documents included in the Administrative Record for the Love Canal site. The Index lists the documents according to the EPA file structure (category number). The Index includes the following information fields:

DOCUMENT NUMBER....	indicates the first and last page numbers of the document. Both page numbers will be the same for one-page documents. In this particular index, the document number consists of a three letter site code followed by microfilm reel and frame numbers.
TITLE.....	indicates the title or an enhanced description of the document in parentheses.
AUTHOR.....	indicates the author or primary originator and the author's corporate affiliation.
RECIPIENT.....	indicates the addressee or primary recipient and the addressee's corporate affiliation.
DATE.....	indicates document date by month/day/year. / / means no date was available.
TYPE.....	indicates the document type.
CATEGORY.....	indicates the EPA file structure number.

APPENDIX D

MODEL POSITION DESCRIPTION FOR ADMINISTRATIVE RECORD COORDINATOR

INTRODUCTION

The incumbent serves as an Administrative Record Coordinator in one of the Regional offices of the Environmental Protection Agency (EPA). [Each Region may want to add an introduction to Superfund and the Regional office here.] The incumbent is responsible for compiling and maintaining administrative record files for CERCLA (Superfund) response action decisions.

Section 113(k) of CERCLA requires the establishment of an administrative record upon which the selection of a response action is based. Such a record is a compilation of all documents which the Agency considered or relied on in making its response action decision. Judicial review of any issues concerning the adequacy of any response action decision is limited to the administrative record. Public participation in the development of the record is required by law.

Establishment of thorough and complete administrative records is essential to EPA's Superfund program. Administrative records which include public participation and withstand judicial scrutiny allow EPA to meet its goals and objectives.

The incumbent will be responsible for compiling and maintaining administrative records for large numbers of Superfund sites. Each record requires coordination with many people including: Federal staff, state and local officials, private contractors, the general public and potentially responsible parties. Further responsibilities include deliberations over which materials to include in each record and requirements for dealing with privileged materials.

MAJOR DUTIES AND RESPONSIBILITIES

1. The incumbent is responsible for compiling and maintaining all of the administrative records for selection of CERCLA response actions for a Regional office of the EPA. The incumbent must have complete knowledge of all rules and procedures governing development of the administrative record files.

2. Receives and reviews all documents submitted by the Remedial Project Manager (RPM), On-Scene Coordinator (OSC), Office of Regional Counsel (ORC) and other appropriate staff for inclusion in the administrative record files. The incumbent will coordinate with staff responsible for deciding what documents are included in the record and will arrange for adding documents to the record file.

3. Compiles the administrative record file for each CERCLA response action. This includes logging the receipt of each document, maintaining a central master file of documents, redacting information from privileged documents as directed by ORC, maintaining any privileged portions of each record using Agency security measures, arranging for copying of documents in each record and transmitting the documents to appropriate repositories.

4. Coordinates the compilation of the administrative record files with state and federal agencies. This includes receiving records maintained by state and federal agencies and notifying appropriate personnel of these records for their review.

5. Maintains and updates (monthly) an index of each administrative record file in conformance with Agency guidelines.

6. Ensures public access to administrative record files. This includes notifying the public of the availability of the record, making the record available for public inspection, coordinating with personnel at the facility where the record is located, maintaining an adequate copying facility and maintaining a log of persons reviewing documents. The incumbent will have to respond to phone calls and visitors wanting information on and from the record. These functions will be coordinated with the Office of Public Affairs and Superfund Community Relations Coordinators.

7. Maintains the Regional Superfund Central Library of guidance documents and technical references.

CONTROLS OVER WORK

The incumbent works under the general supervision of the [Hazardous Waste Branch Chief]. An administrative record is reviewed and certified for litigation by a person designated by the Regional Administrator.

APPENDIX E

COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

USERS MANUAL

U. S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF WASTE PROGRAMS ENFORCEMENT

MAY 1989

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LIST OF TABLES

Appendix

(A) REGIONAL COMPENDIUM LOCATIONS AND ADMINISTRATIVE RECORD COORDINATORS

(B) COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS INDEX

1.0 INTRODUCTION

This manual describes how to use the "Compendium of CERCLA Response Selection Guidance Documents" (Compendium). Each U.S. Environmental Protection Agency (EPA) Regional Office maintains a compendium of guidance documents frequently used during development and selection of response actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

EPA Headquarters used several sources to develop the initial Compendium. These sources included a pamphlet titled "Selected Technical Guidance for Superfund Projects" (OSWER Directive 9200.7-01); the OSWER Directive System; the Superfund, Resource Conservation and Recovery Act (RCRA), and Enforcement dockets; the Hazardous Waste Collection Database; and any existing regional compendiums. The documents in the Compendium are referenced in administrative records for decisions on selection of response actions.

The administrative record described here is the body of documents that form the basis for selection of a CERCLA response action. Establishment of the administrative record is required by §113(k) of CERCLA. An administrative record is the compilation of documents considered or relied on by EPA in making a decision. Documents that EPA anticipates will be included in the administrative record when the decision on a response action selection is made, are referred to as the "administrative record file." Guidance documents, or portions of guidance documents, that are considered or relied on in selecting a CERCLA response action should be part of an administrative record file.

Certain frequently used guidance documents may be referenced in the index to an administrative record but not physically included in the administrative record file. The reference should indicate the title and location of any documents included in the administrative record but maintained in the Compendium, which is kept at a central regional location. If a guidance document that is not listed in the Compendium is considered or relied on in selecting the response action, the document must be physically included in the administrative record file. The Compendium helps reduce the burden of copying and storing multiple copies of frequently used guidance documents.

Section 2.0 of this manual briefly discusses use of the Compendium by EPA personnel and the public. Section 3.0 discusses the Compendium's file and index structure. Documents in the Compendium are filed in three-ring binders and listed on an index which is generated by and

maintained on a computer database. Procedures for updating the Compendium are presented in Section 4.0.

2.0 OVERVIEW OF COMPENDIUM USE

The Compendium is intended for use by two groups: EPA personnel, during the process of response action selection and administrative record development, and the public, for review of documents referenced in the index to an administrative record.

The user should note that although the term "guidance" is often used in discussing the Compendium, it does not imply that only guidance documents are included. The documents may also be policies, memoranda, clarifications, case studies, manuals, handbooks, reports, and other documents used in the selection of CERCLA response actions.

2.1 USE BY EPA PERSONNEL

EPA personnel use the Compendium primarily to reference frequently used guidance documents that may be maintained in the Compendium rather than physically included in each administrative record file. The index must indicate which documents are physically located in the Compendium and must specify the location and accessibility of the Compendium. The index should also reference only the specific documents in the Compendium that were considered or relied on for the site for which the record is being compiled. The index should not reference the entire Compendium.

2.2 USE BY THE PUBLIC

As with any unrestricted document included in a record, the Compendium documents are accessible for public review. When EPA publishes a notice of availability of an administrative record file, that notice will include the location of the Compendium. The Compendium will be available for public viewing at a central regional establishment (for example, the EPA Regional Office), and either at or near the site for which the record is being compiled. (See Appendix A for a list of the locations of each regional copy of the Compendium and the names of the Regional Administrative Record Coordinators.)

3.0 STRUCTURE OF THE COMPENDIUM

Currently, the Compendium is organized into 10 categories. An overview of the file structure is presented below, as well as a discussion of the index that identifies the documents included in the Compendium. This section also discusses the data elements identified in the index. The data elements provide vital information on the documents included in the Compendium and are contained in a database used to compile the Compendium and generate the index.

3.1 FILE STRUCTURE

The Compendium is structured according to 10 major categories that generally reflect the various components of a response action selection under CERCLA. Table 3-1 lists the current Compendium categories. The documents are further grouped into subcategories that indicate their more specific nature, when applicable. For example, the remedial investigation/feasibility study (RI/FS) section of the Compendium is broken down into more specific subcategories to identify the wide range of RI/FS documents available. When the documents apply to multiple categories, secondary references are provided in the Compendium index.

Each document has been assigned a unique four-digit document number. The bound documents contained in each category are arranged numerically. When a user wants to access a document, he or she will find the document filed according to the assigned number. The four-digit number series assigned to each category are also listed in Table 3-1.

3.2 INDEX STRUCTURE

When an administrative record index refers to a document contained in the Compendium, that document is also identified in the Compendium index. The index, contained as the first document in the Compendium, provides the information necessary to identify and locate the desired documents. (For a copy of the current Compendium index, see Appendix B.)

Because in most cases the user will know the title of the document rather than the number assigned, the index lists the documents under each category in alphabetical order. An alphabetical listing of secondary references follows the primary documents listed under each category.

TABLE 3-1

COMPENDIUM CATEGORIES AND NUMBER SERIES

CATEGORIES	NUMBER SERIES
Index	0000
Pre-Remedial	0001-0999
Removal Action	1000-1999
Remedial Investigation/ Feasibility Study	2000-2999
General	2000-2099
RI Data Quality/Site & Waste Assessment	2100-2199
Land Disposal Facility Technology	2200-2299
Other Technologies	2300-2399
Groundwater Monitoring & Protection	2400-2499
ARARs[1]	3000-3999
Water Quality	4000-4999
Risk Assessment	5000-5999
Cost Analysis	6000-6999
Community Relations	7000-7999
Enforcement	8000-8999
Selection of Remedy/Decision Documents	9000-9999

[1] Applicable or Relevant and Appropriate Requirements

The Compendium index is maintained on a database using dBASE III Plus software. The database contains numerous data elements that store the information distinguishing and grouping each document into the appropriate categories. The database is currently maintained at EPA Headquarters.

Maintaining the index in a database allows the information to be organized in different ways. For example, should the Region need an index that is sorted entirely in alphabetical order by title, chronologically by document date, numerically by the number assigned each document, etc., EPA Headquarters can generate and forward such an index. The data elements of the Compendium database, as identified on the index, are included in Appendix B.

4.0 UPDATING THE COMPENDIUM

The Compendium is designed to allow for the periodic addition of newly developed policy or guidance documents. Updates to the Compendium are necessary in the following cases: (1) EPA releases relevant new guidance, policy, reports, etc.; (2) regional staff find additional documents that should be included in the Compendium; and (3) existing documents are revised or superseded. EPA Headquarters will continue to monitor the information sources used to develop the initial Compendium for new or revised documents that may qualify for inclusion in the Compendium.

Guidance documents identified for addition to the Compendium will be reviewed and relevant information will be entered into the existing database. After the database is updated, a new index will be generated and sent to each Regional Office. This new index will replace any previous indices. Hard copies of the additional documents will be sent to each region for inclusion in the Compendium. The revised index will indicate the category for each new document.

4.1 REGIONAL INPUT

Participants involved in the response action selection process, as well as Administrative Record Coordinators, may find documents that are frequently included in administrative records but are not referenced in the Compendium. In such cases it may be desirable to include the documents in the Compendium as part of the updating process. However, since the Compendium is designed to be nationally applicable, only documents used frequently in different regions will be included. Any region-specific document should be maintained in separate regional files and not in the Compendium.

4.2 KEEPING THE COMPENDIUM CURRENT

Once a document is included in the Compendium, it will remain in the Compendium to maintain the integrity of any record that refers to it. However, documents contained in the Compendium may be revised in the future to reflect changes, for example, changes in policy, technology, or law. The most current version of these documents will be added to the Compendium, as appropriate, so that they will be available for the administrative record process

Although no document included in the Compendium will ever be replaced or removed once an administrative record index refers to it, those documents that are superseded will be flagged and identified on a separate index (superseded index) attached to the Compendium's main index. The superseded index will also identify the corresponding revised version added to the Compendium to indicate the new document that should be used.

Response action selections frequently rely on technical data generated at Superfund sites across the country. Such data is often maintained on national databases. Depending on their use and availability, certain of these databases may be included in the Compendium. For example, the Public Health Risk Evaluation Database (PHRED) is part of the Compendium. PHRED is stored on two floppy diskettes that are regularly updated as additional information becomes available. Whenever updated PHRED diskettes are generated, they will be added to the Compendium. Those diskettes that were previously included will also remain in the Compendium and will be identified on the superseded index.

(APPENDIX A)

REGIONAL COMPENDIUM LOCATIONS AND ADMINISTRATIVE RECORD COORDINATORS

Region	Address	Coordinator/PH # 1. Remedial 2. Removal
I	90 Canal Street Boston, MA 02203	1. Brenda Haslett (617)573-1759 FTS 833-1759
	60 Westview Street * Lexington, MA 02173	2. Pam Bruno (617)860-4309
II	26 Federal Plaza New York, NY 10278	1. Jenny Delcimento (212)264-8676 FTS 264-8676
	Woodbridge Avenue * Raritan Depot - Bldg 10 Edison, NJ 08837	2. Norman Vogelsang (201)321-6657 FTS 340-6657
III	841 Chestnut Street Philadelphia, PA 19107	1. Margaret Leva (215)597-3037 FTS 597-3037
		2. Joan Henry (215)597-2711 FTS 597-2711
IV	345 Courtland Street, N.E. Atlanta, GA 30365	1. Debbie Jourdan (404)347-2930 FTS 257-2930
		2. Same
V	~~230 South Dearborn Street~~ ~~Chicago, IL 60604~~ 77 W. Jackson	1. ~~Jamie Neri~~ ~~FTS 353-7440~~
		2. Jan Pfundheller FTS 353-7626
VI	1445 Ross Avenue 12th Floor, Suite 1200 Dallas, TX 75270	1. Karen Witten (214)655-6720 FTS 255-6720
		2. Joann Woods (214)655-2270 FTS 255-2270

* The Compendium was initially distributed to remedial Administrative Record Coordinators only. Copies may be located at this address.

Region	Address	Coordinator/PH # 1. Remedial 2. Removal
VII	726 Minnesota Avenue Kansas City, KS 66101	1. Barry Thierer FTS 276-7052
	25 Funston Road * Kansas City, KS 66115	2. Helen Bennett (913)236-3881 FTS 757-3881
VIII	999 18th Street Suite 500 Denver, CO 80202	1. Carole Macy FTS 330-1281
		2. Tina Ardemus FTS 330-7039
IX	215 Fremont Street San Francisco, CA 94105	1. Tom Mix FTS 484-1960 Don Briggs FTS 556-6637
		2. Holly Hadlock (415)768-1354
X	1200 Sixth Avenue Seattle , WA 98101	1. Lynn Williams (206)442-2121 FTS 399-2121
		2. Same

* The Compendium was initially distributed to remedial Administrative Record Coordinators only. Copies may not be located at this address.

(APPENDIX B)

COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS

INDEX

TABLE OF CONTENTS

*The range for each number series identified represents the numbers assigned to these documents currently in the Compendium.

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CONFIDENTIAL BY ORDER OF THE SELECTION CLAIMS LEGISLATORS

ITEM NO	USE CODE	DATE	AUTHORS	STATUS	PAGES	VOL	ATTACHMENTS	COMMENTS
**	CLASS - CHANGE							
2000	3 CASE SERIES 0-20 SUBSEQUENT CHEMICAL AT SUPERFUND WASTE SITES	04/04/00	- [illegible] - [illegible]	final	830	1		EPA Sec 1 Ex.
2001	3 EPA CLASS FOR EVALUATING DAT ATHENS CONSIDERATIONAL EFFECTS OF EXPOSURE OF [illegible]	04/04/00	- [illegible]	final	250	1		EPA/Exec S.
2002	3 CARCINOGENIC EFFECTS OF [illegible]	04/04/00	- [illegible]	final	300	1		EPA/Exec
2003	3 CASE REPORTING GUIDANCE	04/04/00	- [illegible]	final	40	1		EPA/Exec
2004	4 [illegible] CHEMICAL AGENTS AT SUPERFUND HAZARDOUS WASTE SITES CASE 1-000	04/04/00	- [illegible]. Sec. [illegible] - [illegible] - [illegible] AND [illegible] IN [illegible]	final	250	1		EPA/Exec
2005	4 PROTECTION OF WORKER PLANTS AND NEARBY RESIDENTS FROM CHEMICAL EXPOSURE	04/04/00	- [illegible] IN [illegible] - [illegible], C Alert	final	9	1		EPA/Exec
2006	4 [illegible] EXPOSURE AT HAZARDOUS WASTE SITES: SUMMARY REPORT	04/04/00	- [illegible]	final	90	1		EPA Sec
2007	4 [illegible] FOR ESTIMATING EXPOSURE FROM CHEMICAL RELEASES	04/04/00	- [illegible], 1 D Alert	final	20	1		EPA/Exec
2008	4 CLASS [illegible]	04/04/00	- [illegible]. 04 Alert	final	04	1	[illegible]	EPA/Exec
2009	4 CLASS [illegible]	04/04/00	- [illegible]. 04 Alert	final	04	1	[illegible] [illegible]	EPA/Exec
2010	4 [illegible]	12/04/00	- [illegible]	draft	170	1		EPA/Exec
2011	5 [illegible]	04/04/00	- [illegible]	final	100	1		EPA/Exec
2012	5 [illegible]	12/04/00	- [illegible]	final	120	1		EPA/Exec
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2013	5 A [illegible]	12/04/00	- [illegible] - [illegible]	final	510	1		EPA/Exec
2014	6 CASE [illegible]	04/04/00	- [illegible] - [illegible]	final	510	1		EPA/Exec

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2470	03	[redacted]	05/11/00	[redacted]	Final	23	2	03 [redacted]	

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Doc No	Vol	Title	Date	Authors	Status	Pages	[illegible]	Attachments	[illegible]
**		[illegible]							
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Final	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Final	[illegible]	[illegible]		[illegible]
**		Selection of [illegible]							
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Final	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Final	[illegible]	[illegible]		

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DATA ELEMENT DEFINITIONS

The data elements of the Compendium database, as identified on the index, are shown below:

DATA ELEMENT	DEFINITION
Doc No	Unique four-digit number assigned to a document included in the Compendium according to category.
Vol	Volume number of the binder in which the hard copy of the document is contained.
Title	*Title of the document. Secondary Reference is identified* following the title when a document relates to more than one category. The document itself is filed under the number series assigned to its primary category.
Date	The date the document was published by or released from the issuing office or entity.
Authors	Author(s) and affiliation(s). Also includes identification of the EPA Project Officer and issuing office, where applicable.
Status	Indicates the status of a document, either draft or final version.
Pages	Total number of printed pages of the document, including any attachments.
Tier	Tier 1 or Tier 2. Tier 1 documents are the core documents of the Compendium as listed in the pamphlet titled "Selected Technical Guidance for Superfund Projects," compiled by OERR. Tier 2 documents are all other documents included in the Compendium.
Attachments	Attachments to a document by complete or abbreviated title.
OSWER/EP[illegible]Number	EPA report or OSWER Directive System numbers, where applicable.

LIST OF ORGANIZATIONAL ABBREVIATIONS AND ACRONYMS IDENTIFIED IN THE INDEX

Organization	Acronym
Agency for Toxic Substances and Disease Registry	ATSDR
Center for Environmental Research Information	CERI
Contract Laboratory Program	CLP
U.S. Corps of Engineers	COE
Exposure Assessment Research Division	EARD
Environmental Criteria and Assessment Office	ECAO
Environmental Monitoring Systems Laboratory	EMSL
Emergency Response Division	ERD
Environmental Research Laboratory	ERL
Hazardous Response Support Division	HRSD
Hazardous Site Control Division	HSCD
Hazardous Site Evaluation Division	HSED
Hazardous Waste Engineering Research Laboratory	HWERL
Municipal Environmental Research Laboratory	MERL
Office of Environmental Engineering and Technology	OEET
Office of Emergency and Remedial Response	OERR
Office of Health Effects Assessment	OHEA
Office of Research and Development	ORD
Office of Solid Waste	OSW
Office of Solid Waste and Emergency Response	OSWER
Office of Waste Programs Enforcement	OWPE
Policy Analysis Staff	PAS
Waterways Experiment Station	WES
Waste Management Division	WMD

APPENDIX F

MODEL TRANSMITTAL COVER LETTER

[Name of Contact]
[Address]

Dear [Name of Contact]:

The U.S. Environmental Protection Agency is required by law to establish administrative records "at or near a facility at issue." This administrative record consists of information upon which the Agency bases its selection of response action for a particular Superfund site.

By providing the public with greater access to these records, it is our hope that they will be better equipped to comment constructively on site activities and to understand the issues relating to the selection of the response action at the site.

We appreciate having the [Name of local repository] as the designated administrative record facility for the [Name of site] Superfund site. The enclosed record files, along with any future documents relating to technical activities at the site should be placed in the [Name of local repository] and be available for public review. The record files should be treated as a non-circulating reference - it should not be removed from your facility.

Also enclosed is a fact sheet to assist you and your staff in answering questions posed by the public concerning administrative records for selection of response actions at Superfund sites. Please feel free to distribute this guide to the public.

To ensure the receipt of the administrative record file, I would appreciate your completion of the attached Document Transmittal Acknowledgment form. Please return this form in the enclosed self-addressed, stamped envelope.

Again, I would like to thank you for your cooperation with the U.S. EPA in serving as a Field Repository. If you have any questions or comments, please contact [Name of EPA contact] at [Phone No.].

Sincerely,

[Name]
Administrative Record Coordinator

APPENDIX G

MODEL DOCUMENT TRANSMITTAL ACKNOWLEDGMENT

From: [Regional Office Address]

To: [Field Repository Address]

I acknowledge that I have received the following documents from the U.S. EPA Region ____ Office, pertaining to [Site Name] Superfund site.

Administrative Record Name - [Site Name]

Administrative Record Document Numbers - _____

Signed _____

Date _____

Please return this form to: [Regional Office Address]

APPENDIX H

FACT SHEET

Administrative Records in Local Repositories

The "administrative record" is the collection of documents which form the basis for the selection of a response action at a Superfund site. Under section 113(k) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act (CERCLA), EPA is required to establish an administrative record for every Superfund response action and to make a copy of the administrative record available at or near the site.

The administrative record file must be reasonably available for public review during normal business hours. The record file should be treated as a non-circulating reference document. This will allow the public greater access to the volumes and also minimize the risk of loss or damage. Individuals may photocopy any documents contained in the record file, according to the photocopying procedures at the local repository.

The documents in the administrative record file may become damaged or lost during use. If this occurs, the local repository manager should contact the EPA Regional Office for replacements. Documents may be added to the record file as the site work progresses. Periodically, EPA may send supplemental volumes and indexes directly to the local repository. These supplements should be placed with the initial record file.

The administrative record file will be maintained at the local repository until further notice. Questions regarding the maintenance of the record file should be directed to the EPA Regional Office.

The Agency welcomes comments at any time on documents contained in the administrative record file. Please send any such comments to [name and address]. The Agency may hold formal public comment periods at certain stages of response process. The public is urged to use these formal review periods to submit their comments.

For further information on the administrative record file, contact [name and phone no. of Administrative Record Coordinator].

APPENDIX I

MODEL NOTICE OF PUBLIC AVAILABILITY

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ANNOUNCES THE AVAILABILITY OF THE
ADMINISTRATIVE RECORD
XYZ SITE, [Locality, State]

The U.S. Environmental Protection Agency (EPA) announces the availability for public review of files comprising the administrative record for the selection of the [remedial, removal] action at the XYZ site, [Locality, State]. EPA seeks to inform the public of the availability of the record file at this repository and to encourage the public to comment on documents as they are placed in the record file.

The administrative record file includes documents which form the basis for the selection of a [remedial, removal] action at this site. Documents now in the record files include [preliminary assessment and site investigation reports, validated sampling data, RI/FS work plan, and the community relations plan]. Other documents will be added to the record files as site work progresses. These additional documents may include, but are not limited to, the RI/FS report, other technical reports, additional validated sampling data, comments and new data submitted by interested persons, and EPA responses to significant comments.

The administrative record file is available for review during normal business hours at:

[Repository Name] [Address and Phone #]	and	U.S.EPA - Region 2 [Address and Phone #]

Additional information is available at the following locations:

Verified sampling data and documentation	-	Contract laboratory, [Address and Phone #]
Guidance documents and technical literature	-	EPA-Region 2 [Address and Phone #]

Written comments on the administrative record should be sent to:

[Name], Office of Public Affairs
U.S. EPA - Region 2
[Address and Phone #]

APPENDIX J

MICROFORM APPROVAL MEMORANDUM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OCT 21 [redacted]

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Microfilming the Administrative Record

FROM: Edward J. Hanley, Director
Office of Information Resources Management

TO: Ase R. Frost, Jr., Director
OSWER Information Management Staff

In accordance with EPA Records Management Manual, Chapter 6, dated 7/13/84, I approve OSWER's request for an administrative record micrographic system for regional hazardous waste management programs.

The feasibility study prepared for OWPE, entitled "Assessment of the Suitability and Costs of Alternatives for the Administrative Record" (June 30, 1988), satisfactorily documents and justifies the need for converting the administrative record to microform. In particular, the requirement under SARA to make the administrative record publicly available at or near each hazardous waste site makes microform a cost-effective storage medium.

Please inform each regional hazardous waste program of my approval of OSWER's request and of the need to comply with the remaining provisions of Chapter 6 of the EPA Records Manual should the region proceed with implementing an administrative record micrographic system.

cc: SIRMOs, Region 1 - X

APPENDIX K

MODEL CERTIFICATION

IN THE [NAME OF COURT]

UNITED STATES OF AMERICA,	:	
	:	
Plaintiff,	:	
	:	
v.	:	
	:	
[NAMES OF DEFENDANTS]	:	
	:	
Defendants,	:	CIVIL ACTION NO. [number]
	:	
v.	:	
	:	
[NAMES OF THIRD PARTY DEFENDANTS]	:	
	:	
Third Party Defendants	:	

CERTIFICATION OF DOCUMENTS
COMPRISING THE ADMINISTRATIVE RECORD

The United States Environmental Protection Agency (EPA) hereby certifies that the attached documents constitute the administrative record for selection of response actions under the Comprehensive Environmental Response Compensation and Liability Act or 1980, as amended, for the [name of site] site in [City or County], [State].

By the United States Environmental Protection Agency:

In witness whereof I have subscribed my name this ____ day of _____, 19___ in _____[city]_____.

_____[signature]_____

_____[typed name]_____

APPENDIX L

PREAMBLE TO SUBPART I OF NCP

Subpart I—Administrative Record for Selection of Response Action

Subpart I of the NCP is entirely new. It implements CERCLA requirements concerning the establishment of an administrative record for selection of a response action. Section 113(k)(1) of CERCLA requires the establishment of "an administrative record upon which the President shall base the selection of a response action." Thus, today's rule requires the establishment of an administrative record that contains documents that form the basis for the selection of a CERCLA response action. In addition, section 113(k)(2) requires the promulgation of regulations establishing procedures for the participation of interested persons in the development of the administrative record.

These regulations regarding the administrative record include procedures for public participation. Because one purpose of the administrative record is to facilitate public involvement, procedures for

establishing and maintaining the record are closely related to the procedures governing public participation. General community relations provisions found in other parts of the proposed NCP are addressed elsewhere in this preamble.

The following sections discuss the major comments received on the proposed subpart I and EPA's responses.

Name: General comments.

Proposed rule: Subpart I details how the administrative record is assembled, maintained and made available to the public.

Response to comments: Comments on the administrative record regulations included the suggestion that the preamble provide a general statement differentiating between the administrative record and the information repository.

EPA agrees that while subpart I includes ample information on the requirements of the administrative record, a brief clarification would help to differentiate the record from the information repository.

The information repository includes a diverse group of documents that relate to a Superfund site and to the Superfund program in general, including documents on site activities, information about the site location, and background program and policy guidance. EPA requires an information repository at all remedial action sites and any site where a removal action is likely to extend beyond 120 days. The purpose of the information repository is to allow open and convenient public access to documents explaining the actions taking place at a site.

The administrative record discussed in this subpart, by contrast, is the body of documents that forms the basis of the agency's selection of a particular response at a site, i.e., documents relevant to a response selection that the lead agency relies on, as well as relevant documents and information that the lead agency considers but may reject in the ultimate response selection decision. Thus, the record will include documents the lead and support agency generate, PRP and public comments, and technical and site-specific information. These documents [illegible] overlap with those included in the information repository. The administrative record includes such information as site-specific data and [illegible] guidance documents and technical [illegible] used in the selection of the response action. The information repository may include guides to the Superfund process, background information, fact sheets, press releases, maps, and other information to aid public understanding of a site response, regardless of whether the information has bearing on the eventual response selection at that site.

One commenter felt that there was no mechanism for PRPs to participate in the development of the administrative record. In response, PRPs are given a chance to participate in the development of the administrative record throughout its compilation. EPA will make available information considered in selecting the response action to PRPs and others through the administrative record file. Interested persons may peruse the record file, submit information to be included in the administrative record file, or may comment on its contents during the ensuing public comment period.

Name: Section 300.800(a). Establishment of an administrative record. Section 300.810(a). Contents of the administrative record.

Proposed rule: Section 113(k)(1) of CERCLA states that the "President shall establish an administrative record upon which the President shall base the selection of a response action." EPA used similar language in § 300.800(a) of the proposed rule: "The lead agency shall establish an administrative record that contains the documents that form the basis for the selection of a response action." (Emphasis added.) Section 300.810(a) states that the "administrative record file for selection of a response action typically, but not in all cases, will contain the following types of documents [illegible]" followed by an enumeration of these documents.

Response to comments: EPA's choice of the phrase "form the basis" in § 300.800(a) drew many comments. The commenters expressed concern that the lead agency would have the discretion to include in the administrative record only those documents that support EPA's selected remedy.

[illegible]

form the basis of" the final response selection decision. EPA intends that the regulatory language defining the administrative record file embody general principles of administrative law concerning what documents are included in an "administrative record" for an agency decision. As a result, contrary to the suggestion of the commenters, the proposed definition of the administrative record does not mean that the record will contain only those documents supporting the selected response action.

A commenter asked that the phrase "but not in all cases" be deleted from § 300.810(a), or identify the cases when documents are excluded from the administrative record. EPA believes it better not to attempt to list excluded documents in the NCP since EPA cannot possibly anticipate all the types of documents that will be generated for a site or for future sites, and which of these documents should be excluded except as generally described in § 300.810[illegible]. It should be noted, for example, that although a health assessment done by ATSDR would ordinarily be included in the administrative record, it would not be i[illegible] the assessment was generated by ATSDR after the response is selected.

Others commented that certain documents should always be included i[illegible] the administrative record. EPA believe[illegible] that [illegible] group of documents [illegible] for every typ[illegible] [illegible] each site is [illegible] documents may or may not be [illegible] relevant to the [illegible] particular response actio[illegible] at [illegible] understands that a [illegible] list of required documents would [illegible] in trying to asse[illegible] the [illegible] of the administrativ[illegible] [illegible] list would not be [illegible] often require [illegible]

A [illegible] of comments aske[illegible] [illegible] record alway[illegible] [illegible] including [illegible] sampling data [illegible] documents [illegible] One comment [illegible] sampling d[illegible] [illegible] part of the [illegible] in some [illegible] data. [illegible] the que[illegible] [illegible] control proc[illegible] [illegible] record whe[illegible] [illegible] question of [illegible] data [illegible] found to be [illegible] are not used [illegible] EPA [illegible] response act[illegible] [illegible] not be included i[illegible]

— unvalidated data—as a final have been through the quality control process—which may in limited circumstances be considered by the agency in selecting the response action. It is EPA's policy to avoid using unvalidated data whenever possible. Nonetheless, there are times when the need for action and the lack of validated data requires the consideration of such data in selecting an emergency removal action. If such data are used, they will be included in the record.

In general, only final documents are included in the administrative record files. Draft documents are not part of the record for a decision because they generally are revised or superseded by subsequent drafts and thus are not the actual documents upon which the decision-maker relies. However, drafts (or portions of them) generally will be included in the administrative record for response selection if there is no final document generated at the time the response is selected and the draft is the document relied on. In addition, a draft which has been released to the public for the purpose of receiving comments is also part of the record, along with any comments received.

Similarly, predecisional and deliberative documents, such as staff notes or staff policy recommendations or options papers, do not generally belong in the administrative record because they merely reflect internal deliberations rather than final decisions or factual information upon which the response selection is based. However, pertinent factual information or documents stating final decisions on response selection issues for a site generally would be included in the record.

Technical studies are also part of the record, again, if considered by the lead agency in selecting the response action. One commenter seems to have misinterpreted EPA's intent by assuming that only factual portions of a technical study are part of the record. The entire study, or relevant part of the study, should be part of the record.

Another comment stated that the administrative record should include any studies on cost, cost-effectiveness, permanence, and treatment that underlie the record of decision. These studies are already part of the remedial investigation and feasibility study, which is always included in the record. Another party stated that sampling protocols should be in the administrative record. Sampling protocols are part of the RI/FS work plan, which is also part of the administrative record. And because documents prepared as part of such documents are generally grouped together, EPA has provided in this rulemaking that such grouped or serial documents may be listed as a group in the index to the administrative record file.

A related comment requested that all documents generated by contractors should be included in the record. In response, *any* document that forms the basis of a response selection decision will be included in the administrative record. It is immaterial who develops the document—it can be a contractor, the public (including a PRP), a state or EPA.

One commenter asked that ARAR disputes involving a disagreement over whether a requirement is substantive or administrative be documented in the record. Other comments stated that EPA must ensure that complete ARAR documentation and documentation of all remedial options, not just the selected remedy, be placed in the record. Where ARAR issues are relevant to response selection, lead and support agency-generated documents and public information submitted to the lead agency on this issue would be part of the record. The record will include documentation of each alternative remedy and ARAR studied during the RI/FS process, and the criteria used to select the preferred remedy during the remedy selection process.

EPA also received several comments stating that every document contributing to decision-making should be part of the administrative record. EPA cannot concur in this formulation of the administrative record since it is unclear what "contributing to" means and that phrase may be overly broad. For instance, the term "contributing to" could be interpreted to include all draft documents leading up to a final product. These draft documents do not generally form the basis of the response selection. However, because the administrative record includes documents which form the basis for the decision to select the response action, EPA believes that most "contributing" documents will be included.

One comment stated that the hazard ranking system (HRS) information should be included in the administrative record for selection of the response action. Specifically, they suggested that internal memoranda, data sheets, and the original HRS score should be made available. The National Priorities List (NPL) docket is a public docket, and already contains the relevant ranking information. The information generally relevant to the listing of a site on the NPL is preliminary and not necessarily

action. If however, there is [illegible] in the NPL docket that is relied on in selecting the response action, it will be included in the administrative record.

Another commenter stated that all materials developed and received during the remedy selection process should be made a part of the record, and stated that the NCP currently omits inclusion of transcripts. As noted above, certain documents simply will not be relevant to the selection of response actions. EPA will, as required by the statute, include in the record all those materials, including transcripts, that form the basis for the selection of a response action, whether or not the materials support the decision.

Several commenters asked that the lead agency be required to mail them individual copies of documents kept in the administrative record. These requests included copies of sampling data, a copy of any preliminary assessment petitions, potential remedies, the risk assessment, a list of ARARs, and notification of all future work to be done. Commenters also asked to be notified by mail when a lead agency begins sampling at a site and when a contractor is chosen for a response action. In addition, many asked for the opportunity to comment on the documents mentioned above. A related comment suggested that EPA maintain a mailing list for each site and mail copies of key documents in the record to every party on the list.

EPA believes that maintaining an administrative record file in two places, in addition to a more general information repository, with provisions for copying facilities reflects EPA's strong commitment to keeping the affected public, including PRPs, informed and providing the opportunity for public involvement in response decision-making. Requiring EPA to mail individual copies of documents available in the record file is beyond any statutory requirements, unnecessary due to the ready availability of the documents in the file, and a severe burden on Agency staff and resources. Most of the documents requested above will generally be available in the administrative record for public review and copying. Additionally, the lead agency should maintain a mailing list of interested persons to whom key site information and notice of site activities can be mailed as part of their community relations plan for a site.

One commenter asked that all PRP comments and comments by other interested parties be included in the record, regardless of their

[illegible] comments received during the comment period in the administrative record, regardless of their significance. When the lead agency considers comments submitted after the decision document has been signed, the "significance" of a comment has a bearing on whether it will be included in the administrative record, as specified in § 300.825(c). In addition, while EPA is under no legal obligation to place in the record or consider comments submitted prior to the comment period, EPA will generally, as a matter of policy, consider significant comments submitted prior to the comment period, place them into the record, and respond to them at an appropriate time. However, persons who wish to ensure that the comments they submitted prior to the comment period are included in the record must resubmit such comments during the comment period.

Final rule: Section 300.800(a) is promulgated as proposed.

Name: Section 300.800(b). Administrative record for federal facilities.

Proposed rule: Section 300.800(b) states that the lead agency for a federal facility, whether EPA, the U.S. Coast Guard, or any other federal agency, shall compile and maintain an administrative record for that facility. When federal agencies other than EPA are the lead at a federal facility site, they must furnish EPA with copies of the record index, in addition to other specified documents included in the record. The preamble to the proposed NCP discussion of § 300.800(b) (53 FR 51484) states that EPA will establish procedures for interested parties to participate in the administrative record development, and that EPA may furnish documents which the federal agency is required to place in the record.

Response to comments: One comment stated that EPA should be the custodian for administrative records for federal facilities, especially where the federal facility is a PRP, to avoid any conflict of interest in questions of liability or litigation. Another comment stated that the requirements in § 300.800(b) of the proposed rule would be burdensome to federal agencies in compiling and maintaining the record.

Executive Order 12580 grants federal agencies the authority to "establish the administrative record for selection of response actions for federal facilities under their jurisdiction, custody or control." To avoid the potential for conflicts of interest [illegible] who are [illegible] and maintaining the record. EPA retains sufficient oversight over the content of the record by specifying what goes into the record, by supplementing the record and by requiring an accounting of what is in the record through a report of the indexed contents. EPA believes that these requirements represent sufficient Agency oversight to avoid potential conflicts of interest at federal facilities while ensuring that federal lead agencies remain responsible for compiling and maintaining their own administrative record.

EPA is making a minor editorial change in § 300.800(b)(1) to reflect that the federal agency compiles and maintains an administrative record *for* a facility, and not *at* a facility, since § 300.800(a) already provides that the record will be located at or near that facility.

Final rule: EPA is promulgating the rule as proposed, except for the following minor editorial change in the first sentence of § 300.800(b)(1): "If a federal agency other than EPA is the lead agency for a federal facility, the federal agency shall compile and maintain the administrative record for the selection of the response action for that facility in accordance with this subpart."

Name: Section 300.800(c). Administrative record for state-lead sites.

Proposed rule: Section 113(k) of CERCLA states that the President "shall establish an administrative record upon which the President shall base the selection of a response action." Section 300.800(c), entitled "Administrative record for state-lead sites," requires that states compile administrative records for state-lead sites in accordance with the NCP.

Response to comments: [illegible]

[illegible] minimum requirements for section 113(k). Lead agencies, including states, may provide additional public involvement opportunities at a site. In response to whether or not states should maintain a complete administrative record at or near the site, EPA believes that states must have such a record in order to meet CERCLA section 113(k) requirements.

EPA has included a minor editorial change in § 300.800(c) to reflect that a state compiles and maintains an administrative record for rather than at a given site.

Final rule: EPA is promulgating § 300.800(c) as proposed, except for a minor editorial change in the first sentence as follows: "If a State is the lead agency for a site, the State shall compile and maintain the administrative record for the selection of the response action for that site in accordance with this subpart."

Name: Sections 300.800(d) and 300.800(e). Applicability.

Proposed rule: Section 300.800(d) [illegible] of subpart I [illegible] actions where the [illegible] begins after the [illegible] rules, and for all [illegible] after the [illegible] these rules. Section [illegible] proposes that "[T]his [illegible] to all response actions [illegible] 104 of CERCLA or [illegible] under [illegible] lead agency [illegible] (d) "to the [illegible]."

Response to comments: One [illegible] that the applicable [illegible] should be [illegible] to comply [illegible] all sites where the [illegible] made [illegible] of the [illegible] Another [illegible] (e) be [illegible] lead agencies mus[illegible] in any future [illegible] that all lead [illegible] comply with [illegible] extent [illegible]

[illegible] EPA will adhere as [illegible] for site [illegible] However, [illegible] comply with [illegible] Outside of the

[illegible] the promulgation of these rules cannot be adhered to. For example, under the final rule the administrative record file must be available at the beginning of the remedial investigation phase. If these regulations are promulgated when a site is in the middle of the remedial investigation process, and the administrative record is not yet available, the lead agency cannot at this point comply with these regulations. Additionally, EPA believes that adding language to proposed NCP § 300.800(e) to state that lead agencies will comply with provisions of subpart I in any future action after promulgation of the new rule is unnecessary and redundant; compliance will be legally required, and applicability to all future response actions is implicit in the rule. Likewise, insertion of the word "maximum" before the phrase "extent practicable" is unnecessary since it would give additional emphasis but would not substantively change the requirement or the meaning of the rule.

One comment agreed with EPA's interpretation that subpart I applies to all response actions "sought, secured or ordered administratively or judicially," but others disagreed. Several stated that the term "judicially" should be deleted from § 300.800(d) because they argue that response actions ordered judicially would receive *de novo* adjudication, instead of administrative record review. CERCLA section 113(j)(1) states: "In any judicial action under this Act, judicial review of any issues concerning the adequacy of any response action taken or ordered by the President shall be limited to the administrative record." Commenters contend that this section does not apply to injunctive actions under CERCLA section 106 because these are not actions "taken or ordered by the President." To the contrary, the selection of a response action is a "response action taken * * * by the President." Accordingly, section 113(j)(1) requires that judicial review of the response action selected by the agency is "limited to the administrative record." Further, section 113(j)(2) stipulates that, "in any judicial action under this chapter"—whether for injunctive relief, enforcement of an administrative order or recovery of response costs or damages—a party objecting to "the President's decision in selecting the response action" must demonstrate, "on the administrative record, that the decision was arbitrary or capricious or otherwise not in accordance with law."

EPA received several comments objecting to EPA's determination that judicial review of an endangerment [illegible] administrative record. They stated that as a matter of administrative and constitutional law, a finding of imminent and substantial endangerment is not an issue concerning "the adequacy of the response action," as stated in CERCLA section 113(j), and therefore must receive *de novo* review by a court. A second comment requested that EPA state in the regulation that review of EPA's expenditures in the implementation of a remedy is *de novo*.

An assessment of endangerment at a site is a factor highly relevant to the selection of a response action, and is in fact part of the remedial investigation (RI) process central to the decision to select a response action. Therefore, the determination of endangerment (which will generally be included in the decision document) will be included in the administrative record for selection of a response action and should be reviewed as part of that record. (EPA notes that the term "endangerment assessment" document has been superseded by the term "risk assessment" document, and while assessments of endangerment at a site are still conducted during the RI, it is the "risk assessment" document that becomes part of the record.) In response to the comment that Agency expenditures on a response action should receive *de novo* review, EPA notes that this issue was not raised in the proposed NCP, and is therefore not addressed in the final rule.

Final rule: EPA is promulgating the rule as proposed.

Minor Section 300.805. Location of the administrative record file.

Proposed rule: Section 113(k)(1) of CERCLA states that "the administrative record shall be available to the public at or near the facility at issue. The President also may place duplicates of the administrative record at any other location." Section 300.805 of the proposed NCP provides five exemptions for information which need not be placed at or near the facility at issue: sampling and testing data, guidance documents, publicly available technical literature, documents in the confidential portion of the file, and emergency removal actions lasting less than 30 days.

Response to comments: One commenter supported limiting the amount of information which must be located at or near the site, but many commenters stated that every document contributing to decision-making, including confidential documents which are part of the record, should be located at or near the site and agency [illegible] exclude documents from the site file, asserted that such exclusions undermine active public involvement at the site and are contrary to statutory intent. Another comment stated that requiring the administrative record to be kept in two places, at a central location and at or near the site, runs counter to the statutory requirement of keeping a record only "at or near the facility at issue." One commenter asked that EPA acknowledge that Indian tribal headquarters may be a logical place to keep the administrative record when a Superfund site is located on or near an Indian reservation. A final comment requested that EPA endorse through regulatory language that administrative records can be kept on microfiche or other record management technologies, and have the equivalent legal validity to paper records.

Requiring sampling data and guidance documents to be placed at the site is both unnecessary and, in many cases, very costly. Administrative records are often kept at public libraries where space is limited and cannot accommodate voluminous sampling data for large, complex sites. Summaries of the data are included in the RI/FS, which is located at or near the site. In addition, requiring publicly available technical literature at the site will require copying copyrighted material, an additional expenditure of limited Superfund dollars. Moreover, Agency experience is that, as yet, relatively few people view the administrative record file at or near the site or request review of the sampling data or general guidance documents listed in the index to the site file.

However, EPA has revised the rule to specify that, if an individual wishes to review a document listed in the index but not available in the file located at or near the site, such document, if not confidential, will be provided for inclusion in the file upon request. The individual will not need to submit a Freedom of Information Act Request in order to have the information made available for review in the file near the site. EPA believes that provision of such documents in the file near the site upon request meets the requirement of CERCLA section 113(k) that the record be "available" at or near the site. In addition, this rule does not bar lead agencies from deciding to place this information in the site file without waiting for a request. Lead agencies are encouraged to place as much of this information at or near the site as practical, and to automatically place information at sites where there is a

[illegible] that the information will be in demand or the information is central to the response selection decision.

The confidential portion of the file need not be located at or near the site, and will not be available upon request either at the site or at the central location, since the information is not available for public review.

EPA believes that requiring that the record be located in two places is necessary to ensure both adequate public access to the record files and better lead-agency control over the record documents. The statutory requirement in CERCLA section 113(k)(1) states that the President may also place duplicates of the administrative record at any other location. This section clearly provides authority to maintain a second administrative record at a central location. Section 300.800 of the proposed NCP (53 FR 51818) reflects EPA's decision to make this statutory option a regulatory requirement. A centrally located record [illegible] offer easier access to interested parties located far from the response site.

EPA agrees with the commenter that housing the centrally located copy of the record at Indian tribal headquarters may be appropriate when a Superfund site is located at or near an Indian reservation. In the 1986 amendments to CERCLA, Indian tribes are accorded status equivalent to states, and can be designated lead agencies for response actions, in which case they would also be required to compile and maintain the administrative record at or near the site.

Finally, as EPA stated in the preamble to the proposed NCP, [illegible] the administrative record [illegible] is already [illegible] valid and effective [illegible] may make the administrative record available to the public [illegible] EPA may [illegible] the basis for [illegible] CERCLA [illegible] this should [illegible] rule and has added [illegible] providing [illegible] may make the record [illegible].

Final rule: Section [illegible] is modified as follows:

1. Section [illegible] is added to the rule as follows: "Where documents are placed in the central location but not in the file located at or near the site, such documents shall be added to the file located at or near the site upon request, except for documents included in paragraph (a)(4) of this section."

2. Section 300.805(c) is added to the rule as follows: "The lead agency may make the administrative record file available to the public in microform."

3. The section has been renumbered accordingly.

Name: Sections 300.810(a)–(d). Documents not included in the administrative record file.

Proposed rule: Section 300.810(b) discusses which documents may be excluded from the administrative record. Section (c) discusses privileged information that is not included in the administrative record. Section 300.810(d) discusses confidential information that is placed in the confidential portion of the administrative record.

Response to comments: One commenter argued that § 300.810 should specifically include an exemption for classified documents related to national security. While the NCP currently does not address the potential conflict between national security concerns and the requirement to establish a publicly accessible administrative record, it is not clear that such an exemption could be adequately specified by rule or that an exemption would appropriately resolve this conflict. Section 120(j) provides a national security waiver by Presidential order of any requirement under CERCLA, which can be invoked in certain circumstances. Under this provision, protection of national security interests requires case-by-case review under section 120(j) and not a blanket exemption in the NCP. Nothing in the NCP limits the availability of this option.

Another comment received by EPA [illegible] the record.

A final comment [illegible] that all indexes to the [illegible] should be included in the nonconfidential portion of the administrative record. EPA agrees, believing that an index will let interested parties know in general terms what documents are included in the record without compromising the confidential nature of the information contained in those documents.

Finally, EPA is adding a sentence to § 300.810(a)(6) to clarify that the index can include a reference to a group of documents, if documents are customarily grouped. This will simplify EPA's task without compromising the integrity of the record.

Final rule: 1. EPA is promulgating §§ [illegible] (c) and (d) as proposed with a minor editorial change to clarify the first [illegible] of § 300.810(d).

2. The [illegible] language is added to § [illegible] provide for listing [illegible] in the [illegible] file index: "If [illegible] customarily grouped [illegible] data chain of [illegible] they may be listed [illegible] file."

Name: Section 300.815. Administrative record file for a remedial action.

Proposed rule: The term "administrative record file" is used [illegible] the proposed NCP. Section 300.815(a) proposes that the administrative record file be made available for public inspection at the beginning of the remedial investigation phase.

Response to comments: EPA received [illegible] the [illegible] administrative record file [illegible] there is no [illegible] establishing a [illegible] concerned [illegible] the file [illegible] and PRP [illegible] that do not [illegible] ultimately [illegible] would not [illegible] the final administrative [illegible] the President is [illegible] record. [illegible] NCP [illegible] will [illegible] record [illegible] this reason [illegible] of an [illegible] is that EPA [illegible] or [illegible] until the [illegible]. Until the [illegible] has been selected, t

a no complete administrative record for that decision. Thus, to avoid creating the impression that the record is complete at any time prior to the final selection decision, the set of documents is referred to as the administrative record file rather than the administrative record.

However, this does not mean, as the comments appear to suggest, that the lead agency may "edit" the administrative record file in a manner that removes comments and technical data simply because they are not supportive of the final selection decision. Any comments and technical information placed in the record file for a proposed response action and relevant to the selection of that response action, whether in support of, or in opposition to, the selected response action, become part of the administrative record for the final response selection decision. Such materials will remain in the administrative record file, and will become part of the final administrative record. However, EPA believes that as a matter of law documents that are erroneously placed in the administrative record file (e.g., documents that have no relevance to the response selection or that pertain to an entirely different site) would not necessarily become part of the final administrative record.

EPA received additional comments stating that the administrative record file should be available before the beginning of the remedial investigation phase. These comments suggested that the file be available: When a site is entered into the CERCLIS data base; when the HRS score is calculated; when proposed for inclusion on the NPL; after the preliminary assessment report; and after the remedial site investigation.

EPA believes that the point at which a site is entered into the CERCLIS data base is too early to put any information which would be relevant to a selection of a response action into a record file because at this point there has been no site evaluation and therefore little factual information about the site upon which to base a response decision. Interested parties can already find any information on a site that would be included at the point of the HRS scoring and placement on the NPL in the NPL docket, which is publicly available. The preliminary assessment and remedial investigation stages of a response are premature for making the administrative record available; at these points there is little information relevant to response selection on which to comment or to review. Once the RI/FS work plan is approved, and the RI/FS study begins—including such activities as project scoping, data collection, risk assessment and analysis of alternatives—there is a coherent body of site-specific information with relevance to the response selection upon which to comment. EPA believes that the beginning of the RI/FS phase is the point in the process when it makes sense to start a publicly available record of information relevant to the response selection.

One comment suggested that interested persons would have no chance to comment on the formation of the RI/FS work plan. The comment suggested that the record file should be available before the RI/FS work plan is approved, e.g., with a draft work plan or statement of work. EPA disagrees. Approved work plans are often amended. An interested person may comment on the scope or formation of the work plan, and such comments can be taken into account by the lead agency and incorporated into a final or amended work plan. Such comments must be considered if submitted during the comment period on the proposed action.

Final rule: EPA is promulgating § 300.815(a) as proposed.

Name: Section 300.815, Administrative record file for a remedial action. Section 300.820(a), Administrative record file for a removal action.

Proposed rule: Subpart I requires that the administrative record for a remedial action be available for public review when the remedial investigation begins. Thereafter, relevant documents are placed in the record as generated or received. The proposed regulations also require that the lead agency publish a newspaper notice announcing the availability of the record files, and a second notice announcing that the proposed plan has been issued. A public comment period of at least 30 days is required on the proposed plan. Section 300.820(a) outlines the steps for the availability of the record and public comment for a non-time-critical removal action. EPA solicited comments on a proposal currently under consideration to require quarterly or semi-annual notification of record availability and the initiation of public comment in the Federal Register.

Response to comments: Some commenters suggested that the use of the Federal Register to announce the availability of the administrative record is too costly or of little or no benefit. Several commenters requested clarification on how and when the lead agency should respond to comments. Another stated that lead agencies should be encouraged—though not required—to respond [illegible] before the formal comment period begins.

EPA chose not to require a notice of availability of the administrative record in the Federal Register in this rulemaking because it is still unclear whether the benefits of this additional notice outweigh its costs. EPA may decide in the future to require this additional notice if it determines that such notice would improve notification.

EPA agrees with commenters that clarification is needed as to when the lead agency should respond to comments. We also agree that the lead agency should be encouraged to respond to comments submitted before the public comment period. EPA generally will consider any timely comments containing significant information, even if they are not received during the formal comment period, and encourages other lead agencies to do so. EPA will strive to respond to comments it receives as early as possible, and to encourage other lead agencies to follow suit. However, any lead agency is required to consider and respond to only those comments submitted during a formal comment period. Any other comments are considered at the lead agency's discretion. EPA has revised the language of these sections to reflect the policy on consideration of public comments submitted prior to public comment periods.

One comment recommended that the regulations should provide how long the administrative record must be available, and suggested EPA coordinate efforts with the National Archives about retaining the record as a historical record. Another felt that materials were not always placed into the record in a timely manner, and that the record was not always available to the working public during evenings and weekends accompanied by a copying machine. Similarly, one commenter felt that documents should be placed in the record when they are generated or in a prescribed timeframe of two weeks. Another asked that five copies of key documents be included in the record.

EPA believes that the length of time a record must be available at or near the site will be dependent on site-specific considerations such as ongoing activity, pending litigation and community interest. EPA also believes that difficulties sometimes encountered by the working public require resolution on a site-by-site basis and do not merit a change in the proposed NCP language. Special provisions may have to be made by the records coordinator, with the aid of other site team members, including

[illegible] regional site manager. To ensure that the record location chosen is convenient to the public and that copying facilities are made available. Using public libraries to house the record should promote better availability of the record during non-working hours and on weekends. In response to mandating deadlines for lead agencies to place documents into the administrative record file, Agency guidance already directs record compilers to place documents into the record file as soon as they are received. Agency policy additionally prescribes a suggested timeframe for placing documents in the record file. EPA believes that mandatory deadlines in the NCP would do little to [illegible] the rate at which records are already compiled. The decision to place free copies of key documents in the record at or near the site will be a site-specific decision [illegible] the level of community [illegible]. Those who [illegible] to make copies of key documents or any document [illegible] in the administrative record file should already have access to copying facilities.

EPA received a comment requesting that it publish a joint notice of availability of the [illegible] with a notice of [illegible] Technical Assistance Grants. Another commenter stated that [illegible] and [illegible] (EE/CA) [illegible] in the record for a [illegible] removal action.

Publishing notice of the availability of the record in [illegible] with [illegible] of the availability of Technical Assistance Grants (TAGs) is a good idea where TAGs are available for a removal action. [illegible] TAGs, however, are [illegible] to support citizen involvement in [illegible] [illegible] actions. The [illegible] limitations [illegible] number of [illegible] make [illegible] advisor [illegible] for a [illegible]. As for placing the [illegible] and EE/CA in the [illegible] record, EPA [illegible] documents [illegible] part of the administrative record for the removal action.

Finally, EPA [illegible] change to [illegible]. EPA is [illegible] document" [illegible] action memorandum to allow for situations where the agency's decision document [illegible] a removal action is not named an action memorandum.

Final rule: 1. The second sentences of §§ [illegible], [illegible](a)(2) and [illegible](b)(2) are revised to reflect the new language on responding to comments as follows: "The lead agency is encouraged to consider and respond, as appropriate, to significant comments that were submitted prior to the public comment period."

2. In § [illegible](a)(4), the term "decision document" is substituted for "action memorandum."

3. The remainder of § [illegible](a) is promulgated as proposed.

[illegible] Section [illegible]. Administrative record file for a removal action [illegible].

Proposed [illegible]

[illegible]

available sooner—at least 30 days after initiation of on-site removal activity—because the current 60-day period prevented the consideration of any pre-work comments. A second comment supported the 60-day period. Finally, a commenter argued that it made little sense to make the record available after 60 days for an emergency response because the on-scene coordinator (OSC) report containing most of the response information isn't required to be completed until one year following the response action.

In general, the public participation requirements under § [illegible](b) are designed to preserve both the flexibility and [illegible] required by the lead agency in [illegible] removal action situations as well as EPA's commitment to [illegible] participation and [illegible] community well-[illegible]. EPA believes the notification and [illegible] periods required in [illegible] by both Agency [illegible] public [illegible] language [illegible] shall, as [illegible] public comment [illegible] days" [illegible] nature of [illegible] a [illegible].

[illegible] availability [illegible] removal actions [illegible]

[illegible] inclusion on the NPL are not duplicative.

different decisions. Removal actions do not always take place at sites on the NPL, therefore, the notice requirements are obviously not duplicative for these removal actions. For remedial sites that are on the NPL, the administrative record need not be established for some time after listing on the NPL, so publishing a notice of the availability of the record would be essential to make the affected public cognizant of site progress and their opportunity for review of documents included in the record.

Lastly, the procedures specified in § 300.820(b) are applicable to an emergency removal that starts and finishes within 60 days. However, as provided in § 300.820(b)(2), a comment period is held only where the lead agency deems it appropriate. But because the administrative record is an avenue for public information as well as for public comment, EPA also believes that even if the action is completed before the record file is made available, it is still appropriate to make the record available to the public. There is also no inherent contradiction in the OSC report being available one year after completion of the response action while the administrative record becomes available 60 days after initiation of on-site activities. Since the OSC report is a summary of the site events and is not a document which is considered in the selection of response action, it is not generally included in the administrative record.

Final rule: EPA is promulgating § 300.820(b) as proposed, except that:

1. The second sentence of § 300.820(b)(2) is revised on responding to public comments as described above.

2. Section 300.820(b)(3) is revised consistent with § 300.820(a)(4); the term "action memorandum" is changed to "decision document."

Name: Section 300.825. Record requirements after decision document is signed.

Proposed rule: Section 300.825 describes situations where documents may be added to the administrative record after the decision document is signed. Documents may be added to a record in the following circumstances: When the document addresses a portion of the decision which the decision document does not address or reserves for later; when the response action changes and an explanation of significant differences or an amended decision document is issued; when the agency holds additional public comment periods after the decision is signed; and when the agency receives comments contained elsewhere in the record which could not have been submitted during the public comment period which substantially support the need to significantly alter the response action" (53 FR 51318). In addition, subpart E of the proposed NCP discusses ROD amendments and Explanations of Significant Differences. Explanations of Significant Differences may be used for significant changes which do not fundamentally change the remedy, and do not require public comment. ROD amendments must be used for fundamental changes, and require a public comment period.

Response to comments: One commenter asked that subpart I reflect the factors consistently applied by courts when determining whether the record should be supplemented, including such criteria as Agency reliance on factors not included in the record, an incomplete record, and strong evidence that EPA engaged in improper behavior or acted in bad faith. A related comment stated that since general principles of administrative law apply to administrative record restrictions and supplementing the record, language limiting supplementing the record should be deleted from the NCP. EPA believes that including specific tenets of administrative law governing supplementing of the record in the NCP itself is unnecessary. These tenets apply to record review of response actions whether or not they are included in the NCP. The requirements of § 300.825(c) do not supplant principles on supplementing administrative records.

Another comment recommended that EPA permit the record to be supplemented with any issue contested by a PRP, while granting an objective third party the ability to accept or reject record supplements. EPA already requires that any documents concerning remedy selection submitted by PRPs within the public comment period be included in the record. All significant evidence submitted after the decision document is complete is already included in the record, so long as it meets the requirements of § 300.825(c), is not included elsewhere in the record, could not have been submitted during the public comment period, and supports the need to significantly alter the response action. EPA believes these criteria are reasonable and do not require the use of a third-party arbitrator.

One comment stated that all PRP submissions must be placed in the record in order to protect a party's due process right to be heard. EPA disagrees that all PRP submissions to the lead agency must be placed in the record in order to protect the party's due process rights. The process provided in the rules—including the notice of availability of the proposed plan and the administrative record for review, the availability of all documents underlying the response selection decision for review throughout the decision-making process, the opportunity to comment on the proposed plan and all documents in the administrative record file, the requirement that the lead agency consider and respond to all significant PRP comments raised during the comment period, the notice of significant changes to the response selection, and the opportunity to submit, and requirement that the lead agency consider, any new significant information that may substantially support the need to significantly alter the response selection even after the selection decision—is sufficient to satisfy due process. Moreover, the opportunity provided for PRP and public involvement in response selection exceeds the minimum public participation requirements set forth by the statute. Placing a reasonable limit on the length of time in which comments must be submitted, and providing for case-by-case acceptance of late comments through § 300.825(c), does not infringe upon procedural rights of PRPs.

One commenter asked that the permissive "may" in § 300.825(a) be changed so there is no lead-agency discretion over whether to add to the administrative record documents submitted after the remedy selection, and stated that additional public comment periods as outlined in § 300.825(b) should not be only at EPA's option. A related comment stated that the multiple qualifiers in § 300.825(c), including the phrases "substantially support the need" and "significantly alter the response action" (53 FR 51318), grant EPA overly broad discretionary powers over what documents may be added to the record. The commenter suggests deleting the word "substantially," as well as stating that all comments, even those disregarded by EPA, should be included in the record for the purpose of judicial review. EPA disagrees that the word "may" in either § 300.825(a) or § 300.825(b) is too permissive. Section 300.825(b) of the proposal was simply intended to clarify the lead agency's implicit authority to hold additional public comment periods, in addition to those required under subpart E for ROD amendments, whenever the lead agency decides it would be appropriate. Because these additional comment periods are not

[illegible] permissive language simply reflects the lead agency's discretion with respect to these additional public involvement opportunities. Similarly, lead-agency discretion to add to the administrative record documents submitted after a decision document has been signed provides the lead agency the option to go beyond the minimum requirements for public participation outlined in the statute. In response to requests to delete the qualifiers in § 300.825(c), this language is intentionally designed to *define carefully the circumstances* in which EPA must consider comments submitted after the response action has been selected. Thus standard recognizes CERCLA's mandate to proceed expeditiously to implement selected response actions, but also recognizes that there will be certain circumstances in which significant new information warrants reconsideration of the selected response action. Likewise, § 300.825(c) is intended to provide a reasonable limit on what comments EPA must review or consider when deciding [illegible] been made.

Several commenters requested that PRPs not be [illegible] until after the close of the public comment period. Should be allowed to participate in [illegible] on the record [illegible] of EPA's notification of potential liability. EPA makes significant efforts to involve PRPs as early in the process as possible. When PRPs are [illegible] this is the process. [illegible] EPA will continue to consider comments which are submitted after the [illegible] is signed in accordance with [illegible] § 300.825(c). This is the [illegible] which the PRP is [illegible] in the process. EPA believes that this [illegible] rule is sufficient for [illegible] have identified PRPs the opportunity for submitting [illegible] for the record.

One commenter stated that new information that [illegible] should [illegible] after a ROD is [illegible] required [illegible] comment [illegible] lead [illegible] consider [illegible] case [illegible] agency [illegible] Please [illegible] to § 300.[illegible] comment [illegible] additional [illegible] request [illegible] period [illegible] would be placed in the administrative record file. Although this is what EPA intended in the proposal, a clarification is necessary to ensure consistency.

Final rule: EPA is promulgating § 300.825 as proposed except for an addition to the last sentence of section (b) as follows: "All additional comments submitted during such comment periods that are responsive to the request, and any response to those comments, along with documents supporting the response and any final decision with respect to the issue, shall be placed in the administrative record file."

Subpart J—Use of Dispersants and Other Chemicals

The following sections discuss comments received on subpart J and EPA's responses.

Name: Sections 300.900–300.920. General.

Existing rule: Section 300.61 described the purpose and applicability of existing subpart H (now subpart J), and § 300.62 defines the key terms used in the regulation. Section 300.63 provides that EPA shall maintain a schedule of dispersants and other chemical or biological products that may be authorized for use on oil discharges called the "NCP Product Schedule."

Section 300.64 sets forth the procedure by which an OSC may authorize the use of products listed on the NCP Product Schedule. The section provides that an OSC, with concurrence of the EPA representative to the RRT and the concurrence of the state(s) with jurisdiction over the navigable waters (as defined by the CWA) potentially [illegible] oil discharge, may authorize the use of dispersants, mechanical methods, and biological additives listed on the NCP Product Schedule.

This section also provides that if the OSC determines that the use of a dispersant, chemical, biological product, or mechanical method is necessary to prevent or substantially reduce a hazard to human life and that it is not possible in time to obtain the needed concurrences, the OSC may unilaterally authorize the use of any product, including a product not on the NCP Product Schedule. In such instances, the OSC must inform the EPA RRT representative and the affected states of the use of a product as soon as possible and must obtain their concurrence for the continued use of the product upon the threat to human life has subsided. This provision anticipates delays in potentially life-threatening situations, such as spills of highly flammable petroleum products in harbors or near populated areas. [illegible] they will not be listed on the Schedule, this section also provides for authorization of the use of [illegible] agents on a case-by-case basis. The use of sinking agents is prohibited.

Section 300.64 explicitly encourages advance planning for the use of dispersants and other chemicals. The OSC is authorized to approve the use of dispersants and other chemicals without the concurrence of the EPA representative to the RRT and the affected states if those parties have previously approved a plan identifying the products that may be used and the particular circumstances under which their use is preauthorized.

Section 300.65 details the data that must be submitted before a dispersant, surface collecting agent, or biological additive may be placed on the NCP Product Schedule. Section 300.66 describes the procedures for placing a product on the Product Schedule and also sets forth requirements designed to avoid/prevent misrepresentation or misinterpretation of the meaning of the placement of a product on the Schedule, including the wording of a disclaimer to be used in product advertisements or technical literature referring to placement on the Product Schedule.

Appendix C details the methods and types of apparatus to be used in carrying out the revised standard dispersant effectiveness and aquatic toxicity tests. Appendix C also sets forth the format required for summary presentation of product test data.

Proposed rule: Proposed subpart J is very similar to subpart H and contains only minor revisions. Section numbers and references to other sections and subparts have been changed where appropriate. Technical changes and clarifying changes to improve [illegible] have been made.

[illegible] previously presented in subpart H have been moved to subpart J. A new definition has been added [illegible] spill control [illegible], a list of data [illegible] discharges still [illegible] proposed to be added to § 300.900. The definition for navigable waters is as defined in 40 CFR 110.1.

Section 300.910, which addressed "Authorization to Use," was modified slightly in the proposed regulation to emphasize the importance of obtaining authorization for the use of dispersants and other chemicals from the appropriate EPA representatives to the Regional Response Team (RRT) and the DOC/DOI natural resource trustees "as appropriate."

[illegible] to [illegible]—Applicability of DOC/DOI trustees. Many commenters opposed the inclusion of the DOC/DOI trustees in

APPENDIX M

SUBPART I OF NCP

Subpart I—Administrative Record for Selection of Response Action

§ 300.800 Establishment of an administrative record.

(a) *General requirement.* The lead agency shall establish an administrative record that contains the documents that form the basis for the selection of a response action. The lead agency shall compile and maintain the administrative record in accordance with this subpart.

(b) *Administrative records for federal facilities.* (1) If a federal agency other than EPA is the lead agency for a federal facility, the federal agency shall compile and maintain the administrative record for the selection of the response action for that facility in accordance with this subpart. EPA may furnish documents which the federal agency shall place in the administrative record file to ensure that the administrative record includes all documents that form the basis for the selection of the response action.

(2) EPA or the U.S. Coast Guard shall compile and maintain the administrative record when it is the lead agency for a federal facility.

(3) If EPA is involved in the selection of the response action at a federal facility on the NPL, the federal agency acting as the lead agency shall provide EPA with a copy of the index of documents included in the administrative record file, the RI/FS workplan, the RI/FS released for public comment, the proposed plan, any public comments received on the RI/FS and proposed plan, and any other documents EPA may request on a case-by-case basis.

(c) *Administrative record for state-lead sites.* If a state is the lead agency for a site, the state shall compile and maintain the administrative record for the selection of the response action for that site in accordance with this subpart. EPA may require the state to place additional documents in the administrative record file to ensure that the administrative record includes all documents which form the basis for the selection of the response action. The state shall provide EPA with a copy of the index of documents included in the administrative record file, the RI/FS workplan, the RI/FS released for public comment, the proposed plan, any public comments received on the RI/FS and proposed plan, and any other documents EPA may request on a case-by-case basis.

(d) *Applicability.* This subpart applies to all response actions taken under section 104 of CERCLA or sought, secured, or ordered administratively or judicially under section 106 of CERCLA, as follows:

(1) Remedial actions where the remedial investigation commenced after the promulgation of these regulations; and

(2) Removal actions where the action memorandum is signed after the promulgation of these regulations.

(e) For those response actions not included in paragraph (d) of this section, the lead agency shall comply with this subpart to the extent practicable.

§ 300.805 Location of the administrative record file.

(a) The lead agency shall establish a docket at an office of the lead agency or other central location at which documents included in the administrative record file shall be located and a copy of the documents included in the administrative record file shall also be made available for public inspection at or near the site at issue, except as provided below:

(1) Sampling and testing data, quality control and quality assurance documentation, and chain of custody forms, need not be located at or near the site at issue or at the central location, provided that the index to the administrative record file indicates the location and availability of this information.

guidance documents.

(3) Publicly available technical literature not generated for the site at issue, such as engineering textbooks, articles from technical journals, and toxicological profiles, need not be located at or near the site at issue or at the central location, provided that the literature is listed in the index to the administrative record file or the literature is cited in a document in the record.

(4) Documents included in the confidential portion of the administrative record file shall be located only in the central location.

(5) The administrative record for a removal action where the release or threat of release requires that on-site removal activities be initiated within hours of the lead agency's determination that a removal is appropriate and on-site removal activities cease within 30 days of initiation, need be available for public inspection only at the central location.

(b) Where documents are placed in the central location but not in the file located at or near the site, such documents shall be added to the file located at or near the site upon request, except for documents included in paragraph (a)(4) of this section.

(c) The lead agency may make the administrative record file available to the public in microform.

§ 300.810 Contents of the administrative record file.

(a) Contents. The administrative record file for the selection of a response action typically, but not in all cases, will contain the following types of documents:

(1) Documents containing factual information, data and analysis of the factual information, and data that may form a basis for the selection of a response action. [illegible] ATSDR [illegible] supporting the lead agency's [illegible] evaluations [illegible]

[illegible] the selection of the response action. Such documents may include guidance on conducting remedial investigations and feasibility studies, guidance on determining applicable or relevant and appropriate requirements, guidance on risk/exposure assessments, engineering handbooks, articles from technical journals, memoranda on the application of a specific regulation to a site, and memoranda on off-site disposal capacity.

(3) Documents received, published, or made available to the public under § 300.815 for remedial actions, or § 300.820 for removal actions. Such documents may include notice of availability of the administrative record file, [illegible] proposed plan [illegible] by the lead agency, and responses to significant comments.

(4) [illegible]

(5) [illegible] administrative orders and [illegible]

(6) An index of the documents included in the administrative record file. [illegible] they may be listed as a group in the index to the administrative record file.

(b) Documents not included in the administrative record file. The lead agency is not required to include [illegible] administrative record file [illegible] basis for the selection of the response action. [illegible]

[illegible] response action and the information is not included in any other document in the administrative record file.

[illegible]

make it disclosable and the summary shall be placed in the publicly available portion of the administrative record file. The confidential or privileged document itself shall be placed in the confidential portion of the administrative record file. If information, such as confidential business information, cannot be summarized in a disclosable manner, the information shall be placed only in the confidential portion of the administrative record file. All documents contained in the confidential portion of the administrative record file shall be listed in the index to the file.

§ 300.815 Administrative record file for a remedial action.

(a) The administrative record file for the selection of a remedial action shall be made available for public inspection at the commencement of the remedial investigation phase. At such time, the lead agency shall publish in a major local newspaper of general circulation a notice of the availability of the administrative record file.

(b) The lead agency shall provide a public comment period as specified in § 300.430(f)(3) so that interested persons may submit comments on the selection of the remedial action for inclusion in the administrative record file. The lead agency is encouraged to consider and respond as appropriate to significant comments that were submitted prior to the public comment period. A written response to significant comments submitted during the public comment period shall be included in the administrative record file.

(c) The lead agency shall comply with the public participation procedures required in § 300.430(f)(3) and shall document such compliance in the administrative record file.

(d) Documents generated or received after the record of decision is signed shall be added to the administrative record file only as provided in § 300.825.

§ 300.820 Administrative record file for a removal action.

(a) If, based on the site evaluation, the lead agency determines that a removal action is appropriate and that a planning period of at least six months exists before on-site removal activities must be initiated:

(1) The administrative record file shall be made available for public inspection when the engineering evaluation/cost

analysis (EE/CA) is made available for public comment. At such time, the lead agency shall publish in a major local newspaper of general circulation a notice of the availability of the administrative record file.

(2) The lead agency shall provide a public comment period as specified in § 300.415 so that interested persons may submit comments on the selection of the removal action for inclusion in the administrative record file. The lead agency is encouraged to consider and respond, as appropriate, to significant comments that were submitted prior to the public comment period. A written response to significant comments submitted during the public comment period shall be included in the administrative record file.

(3) The lead agency shall comply with the public participation procedures of § 300.415(m) and shall document compliance with § 300.415(m)(3)(i) through (iii) in the administrative record file.

(4) Documents generated or received after the decision document is signed shall be added to the administrative record file only as provided in § 300.825.

(b) For all removal actions not included in paragraph (a) of this section:

(1) Documents included in the administrative record file shall be made available for public inspection no later than 60 days after initiation of on-site removal activity. At such time, the lead agency shall publish in a major local newspaper of general circulation a notice of availability of the administrative record file.

(2) The lead agency shall, as appropriate, provide a public comment period of not less than 30 days beginning at the time the administrative record file is made available to the public. The lead agency is encouraged to consider and respond, as appropriate, to significant comments that were submitted prior to the public comment period. A written response to significant comments submitted during the public comment period shall be included in the administrative record file.

(3) Documents generated or received after the decision document is signed shall be added to the administrative record file only as provided in § 300.825.

§ 300.825 Record requirements after the decision document is signed.

(a) The lead agency may add documents to the administrative record file after the decision document selecting the response action has been signed if:

(1) The documents concern a portion of a response action decision that the decision document does not address or reserves to be decided at a later date; or

(2) An explanation of significant differences required by § 300.435(c), or an amended decision document is issued, in which case, the explanation of significant differences or amended decision document and all documents that form the basis for the decision to modify the response action shall be added to the administrative record file.

(b) The lead agency may hold additional public comment periods or extend the time for the submission of public comment after a decision document has been signed on any issues concerning selection of the response action. Such comment shall be limited to the issues for which the lead agency has requested additional comment. All additional comments submitted during such comment periods that are responsive to the request, and any response to these comments, along with documents supporting the request and any final decision with respect to the issue, shall be placed in the administrative record file.

(c) The lead agency is required to consider comments submitted by interested persons after the close of the public comment period only to the extent that the comments contain significant information not contained elsewhere in the administrative record file which could not have been submitted during the public comment period and which substantially support the need to significantly alter the response action. All such comments and any responses thereto shall be placed in the administrative record file.

Subpart J—Use of Dispersants and Other Chemicals

§ 300.900 General.

(a) Section 311(c)(2)(G) of the Clean Water Act requires that EPA prepare a schedule of dispersants and other chemicals, if any, that may be used in carrying out the NCP. This subpart makes provisions for such a schedule.

(b) This subpart applies to the navigable waters of the United States and adjoining shorelines, the waters of the contiguous zone, and the high seas beyond the contiguous zone in connection with activities under the Outer Continental Shelf Lands Act, activities under the Deepwater Port Act of 1974, or activities that may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States, including resources under the Magnuson Fishery Conservation and Management Act of 1976.

(c) This subpart applies to the use of any chemical agents or other additives as defined in subpart A of this part that may be used to remove or control oil discharges.

§ 300.900 NCP Product Schedule.

(a) *Oil Discharges.* (1) EPA shall maintain a schedule of dispersants and other chemical or biological products that may be authorized for use on oil discharges in accordance with the procedures set forth in § 300.910. This schedule, called the NCP Product Schedule, may be obtained from the Emergency Response Division (OS-210), U.S. Environmental Protection Agency, Washington, DC 20460. The telephone number is 1-202-382-2190.

(2) Products may be added to the NCP Product Schedule by the process specified in § 300.920.

(b) *Hazardous Substance Releases* [Reserved].

§ 300.910 Authorization of use.

(a) The OSC, with the concurrence of the EPA representative to the RRT and, as appropriate, the concurrence of the RRT representatives from the states with jurisdiction over the navigable waters threatened by the release or discharge, and in consultation with the DOC and DOI natural resource trustees, when practicable, may authorize the use of dispersants, surface collecting agents, biological additives, or miscellaneous oil spill control agents on the oil discharge, provided that the dispersants, surface collecting agents, biological additives, or miscellaneous oil spill control agents are listed on the NCP Product Schedule.

(b) The OSC, with the concurrence of the EPA representative to the RRT and, as appropriate, the concurrence of the RRT representatives from the states with jurisdiction over the navigable waters threatened by the release or discharge, and in consultation with the DOC and DOI natural resource trustees, when practicable, may authorize the use of burning agents on a case-by-case basis.

(c) The OSC may authorize the use of any dispersant, surface collecting agent, other chemical agent, burning agent, biological additive, or miscellaneous oil spill control agent, including products not listed on the NCP Product Schedule, without obtaining the concurrence of the EPA representative to the RRT, the RRT representatives from the states with jurisdiction over the navigable waters threatened by the release or discharge, when, in the judgment of the OSC, the use of the product is necessary to prevent or substantially reduce a hazard to human life. The OSC is to inform the

Exhibit E

LEVEL 1 - 2 OF 3 DOCUMENTS

BURNS INDIANA STATUTES ANNOTATED

*** THIS SECTION IS CURRENT THROUGH THE 1991 SUPPLEMENT ***
*** (1991 SECOND SPECIAL SESSION) ***

DIVISION 1. GENERAL GOVERNMENT
TITLE 13. ENVIRONMENT
ARTICLE 7. ENVIRONMENTAL MANAGEMENT
CHAPTER 16.5. POLYCHLORINATED BIPHENYLS AND TERPHENYLS

Burns Ind. Code Ann. § 13-7-16.5-9

STATUS: CONSULT SLIP LAWS CITED BELOW FOR RECENT CHANGES TO THIS DOCUMENT
LEXSEE 1992 Ind. HEA 1298 -- See section 7.

§ 13-7-16.5-9. Incineration of PCB --Permit required --Study of alternative PCB technologies.

(a) As used in this section, "alternative PCB technology" means a technology for the treatment and disposal of PCB that presents an actual or potential alternative to incineration.

(b) A person may not incinerate PCB in an incinerator unless the person holds a permit issued by the commissioner specifically authorizing the incineration of PCB in the incinerator.

(c) The commissioner may not:

(1) Issue; or

(2) Consider an application for;

a permit specifically authorizing the incineration of PCB until the study required by subsection (d) is concluded.

(d) The department, in cooperation with the United States Environmental Protection Agency, an applicant for a permit issued under this section, and a city or town in which an incinerator described under this section is or will be located, shall conduct a study of alternative PCB technologies. The study must include an assessment of the efficacy and the technical and economic feasibility of the following:

(1) Alternative technologies such as the following:

(A) The application of lime to break down PCB.

(B) The low temperature thermal disorption [desorption] process.

(C) Disorption [desorption] and vaporization extraction.

(D) Plasma torch technology.

(E) Bacterial remediation.

(2) Other technologies identified by the commissioner as having possible value in the treatment or disposal of PCB in Indiana.

(e) The study required by subsection (d) must be concluded before July 1, 1993. At the conclusion of the study the commissioner shall prepare a report setting forth the results of the study. The commissioner shall present the report to the governor and the general assembly and make copies of the report available to the public. [P.L.128-1991, § 2.]

COMPILER'S NOTES. The bracketed word "desorption" was inserted in subsections (d)(1)(B) and (d)(1)(C) by the compiler in order to correct a misspelling.

EFFECTIVE DATES. P.L.128-1991, § 6, declared an emergency. Approved May

EXHIBIT
E

Exhibit F

WARZYN

Report
Text, Tables, Figure
60251

Remedial Investigation Report
Ecological Assessment
ACS NPL Site
Griffith, Indiana

Prepared for:
Steering Committee
ACS PRP Group

Prepared by:
Warzyn Inc.
Madison, Wisconsin

EXHIBIT
G

June 1991

WARZYN

July 2, 1991

Robert E. Swale, RPM
Mail Code 5HS-11
U.S. EPA, Region V
230 South Dearborn
Chicago, Illinois 60604

RE: Letter of Transmittal
Final Draft Ecological Assessment
American Chemical Services NPL Site
Warzyn Project No. 60251

Dear Mr. Swale:

In accordance with the project schedule, Warzyn is submitting for your review the final draft Ecological Assessment for the ACS NPL Site. This draft incorporates the Agency's comments, dated April 24, 1991, to the Ecological Evaluation portion of the Baseline Risk Assessment (Section 7.2) of the Draft Remedial Investigation Report.

In accordance with your request, we are submitting six copies of the Ecological Evaluation portion of Section 7.2. If you have questions, please call me at (215) 964-0808.

Sincerely,

WARZYN INC.

Peter J. Vagt

Peter J. Vagt, Ph.D., CPG
Project Coordinator

KJD.ccf.DRV
[mad-107-85]
60251.17

Enclosure

cc: A. Perellis

THE PERFECT BALANCE
BETWEEN TECHNOLOGY
AND CREATIVITY

MADISON
ONE SCIENCE COURT
P.O. BOX 8554
MADISON, WI 53708
(608) 241-[illegible]
FAX (608) 274-2513

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7.2 ECOLOGICAL ASSESSMENT

7.2.1 Objectives

The objectives of the Ecological Assessment are to characterize the natural habitats and populations that may be influenced by the Site and to evaluate the actual or potential adverse effects contaminants have on these habitats and populations. The approach of the ecological assessment includes identifying contaminants of potential concern, pathways of contamination migration, and populations (floral and faunal species) potentially affected by Site contamination. Effects of the contaminants of concern on the target populations are assessed in terms of ecological endpoints. The Ecological Assessment estimates the risks to species of concern for the current Site status.

In the absence of published guidance documents for calculating quantitative ecological risks, review comments and examples provided by U.S. EPA (Charters, personal communication, 1991) were used to develop this Ecological Assessment. Guidance for portions of the Ecological Assessment are provided by the U.S. EPA in the following references:

U.S. Environmental Protection Agency, 1989a. Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference. EPA/600/3-89/013.

U.S. Environmental Protection Agency, 1989b. Risk Assessment Guidance for Superfund. Volume I. Human Health Evaluation Manual (Part A), EPA/540/1-89/002. (RAGS, Vol. I).

U.S. Environmental Protection Agency, 1989c. Risk Assessment Guidance for Superfund. Volume II Environmental Evaluation Manual. EPA/540/1-89/001. (RAGS, Vol. II).

The Ecological Assessment addresses selected Site contaminants that likely represent the greatest hazard to biological populations, based on greatest toxicity or greatest detected concentration. Species are selected to be representative of populations in the Site environment. Although some of these may not be present at the Site currently, future conditions may allow these species to occur. The Ecological Assessment is an evaluation of risk to ecological population from the Site, based on the effects of selected Site contaminants to species representative of the Site area.

7.2.2 Ecological Assessment Scope

This Ecological Assessment addresses the ecological resources of the Site, as described in Section 1.3.1 of this RI report, and the surrounding areas. Surface water run-off and run-on for the Site area are limited by former construction activities. Construction of the Grand Trunk Railroad grade (northern side), the now abandoned Erie Lackawanna Railroad grade (southwestern side), and Colfax Avenue (eastern side) has isolated the Site and a small area west of it to form a watershed of approximately 130 acres. Surface water flow into the Site area occurs through one drainage ditch. Surface water runoff is captured within the watershed by internal drainage.

The major emphasis of the Ecological Assessment is on wetlands in the Site area; most other areas are or have been developed or disturbed to some extent. Terrestrial habitats are mostly limited to areas that have been used in the past as landfill or disposal sites.

A wetland assessment of the Site was performed by the U.S. Fish and Wildlife Service (F&WS). A copy of the F&WS report is included in Appendix N. Information from the F&WS report is supplemented in this Ecological Assessment by Warzyn's Site observations. This Ecological Assessment addresses baseline conditions for the Site in its current condition and use. Future Site use will be addressed by Feasibility Study remediation alternatives. Assessments of risks to ecological resources based on future Site use will vary with the Feasibility Study alternatives and are addressed in a discussion of those alternatives.

7.2.3 Study Area Description

As described in Section 7.2.2 above, the Ecological Assessment addresses the watershed formed by transportation corridors between which the Site is located. This area, of approximately 130 acres, includes primarily upland and wetland habitats.

7.2.3.1 Hydrological Summary

As described in Sections 4.4, 5.3, and 6.3 of this RI report, the Site watershed is limited in area. Surface inflow and outflow are minor in nature. Water sources are primarily from rainfall and snow melt within the watershed. Discharge from the watershed occurs primarily through evapotranspiration (i.e., evaporation from plant material).

Surface water drainage from the Grand Trunk Western Railroad tracks appears to be channelized into a drainage ditch and culvert discharging into the Site at location SD10 (see Figure 2-4). The drainage ditch parallels the Grand Trunk Western Railroad tracks on the southern side of the rail line for approximately 1,000 ft to the northwest, at which point the ditch turns to the south and bisects Wetland I (as designated in the F&WS report) from approximately north to south. This surface drainage system appears to end at the Chesapeake and Ohio Railroad grade, causing surface water to back-up into Wetland I and infiltrate or evaporate.

Site observations suggest the drainage from Wetland I through a culvert into Wetland II no longer occurs. Efforts to dewater the active portion of the City of Griffith Landfill appear to have altered surface water drainage in the area. Although surface water from a ditch on the southern side of the Chesapeake and Ohio Railroad tracks drains into Wetland II, drainage from the City landfill and the off-Site containment area are routed to a City of Griffith sanitary sewer. The isolated drainage areas are indicated in Figure 4-12. Small amounts of water from a new disposal cell are pumped into a ditch west of the landfill, which is connected to wetlands south of the Erie Lackawanna Railroad grade.

Shallow groundwater flow paths from the Site plant property include drainage to the northwest and west (paths 1 and 2 in Figure 4-21). These paths may result in discharge to Wetland I under some hydrologic conditions, causing the wetland to provide some groundwater discharge function.

7.2.3.2 Aquatic Areas

Most of the surface drainages described above are ephemeral drainage ditches. Based on the density of cattails around it, the drainage ditch through Wetland I appears to contain water much of the year, but due to its narrow width, provides limited aquatic habitat.

Permanent ponds on the Site include a fire pond and process lagoon on the Site plant property and a disposal cell at the landfill. Because of their industrial use, the Site plant ponds do not provide aquatic habitat. The disposal cell at the landfill has been recently excavated (February 1989) and has received limited colonization by aquatic species. Water is continually being pumped from this cell by the landfill operators in anticipation of its future use.

7.2.3.3 Site Wetlands

The F&WS report has delineated and described two wetland areas in the Site watershed, separated from each other by the Chesapeake and Ohio Railroad grade. The northern wetland, designated Wetland I, is approximately 29 acres in size. Wetland II, south of the Chesapeake and Ohio Railroad tracks, covers approximately 5 acres. Wetland areas are shown in Figure 7-3. Figure 4-21 indicates groundwater flow from the upland Site areas to Wetlands I and II; thus, these areas function as groundwater discharge areas for at least a portion of the year.

Wetland community types described by the F&WS include the following types:

- PEMF-Palustrine, emergent, semi-permanently flooded
- PEMC-Palustrine, emergent, seasonally flooded
- PFO1C-Palustrine, forested, broadleaf deciduous, seasonally flooded
- PSS1C-Palustrine, scrub-shrub, broadleaf deciduous, seasonally flooded
- PUBF- Palustrine, unconsolidated bottom, semi-permanently flooded

Classifications are based on standard definitions according to Cowardin, et al. (1979).

Most of the PEMF and much of the PEMC areas are dense cattail (Typha spp.) marshes. Adjoining marsh areas are typically less frequently inundated than the cattail marshes and are dominated by sedges (Carex sp.) and wetland ferns (sensitive fern - Onoclea sensibilis and marsh fern - Thelypteris thelypteroides). Most other wetland areas present are mixed scrub-shrub, forested areas of only occasional inundation. These areas are dominated by willow (Salix spp.), dogwood (Cornus spp.), and sometimes cottonwoods (Populus deltoides), and slippery elms (Ulmus rubra).

7.2.3.4 Upland Habitats

Mature oak (Quercus spp.) forests are located on the western and northeastern corners and on the eastern side of the Site (see Figure 7-3). The large size of some of the mature trees suggests that, historically, areas that were too dry for the development of wetlands were established with oak forests. The perimeters of these woods appear to be the result of human disturbance to the oak forests, as they include invader species such as cottonwoods, aspens (Populus tremula), and sumacs (Rhus typhina).

Other terrestrial areas within the Site watershed are developed. The Site plant property is fenced and devoid of vegetation, providing minimal habitat. The City landfill is either actively being operated and bare of vegetation, or contains scarce grass cover on the inactive portions. The inactive landfill and parts of the off-Site containment area provide some field (grassland) habitat. The Kapica Drum property consists of buildings and crushed gravel surface.

7.2.3.5 Habitats of Surrounding Areas

Habitats near the Site are similar to those on-Site, and prior to development of the area, were likely continuous with Site habitats. As described in the F&WS report, wetlands are located on the northern, northwestern, eastern, and southern sides of the Site. Roads and drainage ditches appear to restrict surface water connections between these wetlands and the Site wetlands. Figure 4-21 does not indicate a groundwater

flow path from the Site to the off-Site wetlands. Although there are wetlands adjacent to Turkey Creek one mile south of the Site, there does not appear to be a surface connection between Site wetlands and the creek-side wetlands. Wetland types are similar to those on-Site, including both marshes and wooded habitats.

Several bodies of standing water, most of them excavated, are within one mile of the Site. These ponds are northeast of the Site, out of the shallow groundwater path from the Site, or adjacent to Turkey Creek, almost one mile south of the Site.

The area surrounding the Site is sparsely populated and includes some hardwood forest habitats. The oak forest to the east of the Site plant is intermixed with wetlands. Less-dense hardwood stands are west and southeast of the Site. Agricultural fields are also southeast of the Site.

7.2.4 Contaminants of Concern

Contaminants of ecological concern are those detected in environmental media of the habitats on-Site. These habitats. and appropriate environmental media sampled. include the following:

- Wetlands - Surface water, sediments
- Drainage ditches - Surface water, sediments
- Terrestrial habitats - Off-Site containment area soils

Values for the shallow aquifer monitoring wells are used to represent concentrations in the wetland surface waters because wetland waters were not sampled. Because the wetlands function as discharge areas for groundwater, shallow groundwater is likely to reach the wetlands.

Chemicals of concern for terrestrial habitats are considered to be those chemicals found in shallow soils (≤ 4 ft) from the off-Site containment area soil borings. Chemicals found in deeper soils are not readily available to biological communities. Soils from the ACS facility and most of the Kapica Drum property are devoid of vegetation and do not support appreciable ecological communities. Other environmental media and the surface water/sediment locations on the Site plant property do not reflect contaminants or concentrations available to the natural ecosystem.

Maximum values for contaminants detected in the environmental media are included in Table 7-39. Values are expressed in exponential notation as milligram per kilogram or milligram per liter to be consistent with the Human Health Evaluation (Section 7.1). Table 7-39 also includes toxicological and chemical data that are used to evaluate relative importance of the contaminants found in environmental media.

Representative contaminants for consideration of effects on area species are selected based on the results of Table 7-40. Relative importance of contaminants is based on toxicity and chemical properties. Importance factors are developed for the contaminants and are expressed as percents of the total importance to demonstrate the relative importance of individual contaminants.

Importance factors based on contaminant concentration and toxicity are assessed by reference doses (RfDs) for non-carcinogenic toxicological effects. The chemical values from Table 7-39 represent either the maximum values found in each medium or the upper bound of the 95% confidence limit for that medium. This concentration for each contaminant is divided by an RfD. Thus, a contaminant present at a high concentration with a low RfD (greater sensitivity to the contaminant) yields a greater importance factor. A contaminant present in large concentrations, but relatively less toxic (higher RfD value) yields a lesser importance factor, as do contaminants present in smaller concentrations. Species-specific RfDs are taken from HEAST (U.S. EPA. 1991). with uncertainty factors for human populations removed. The factor (X10) for extrapolation from animal to human species and the factor (X10) for average individual to most sensitive individual have been removed; the factor for subchronic to chronic effects (X10) has been retained.

Importance factors based on contaminant concentration and chemical factors consider the octanol-water coefficient (Koc) as a factor in the distribution of organic contaminants in environmental media. Maximum contaminant concentrations for surface soils, surface water, and sediments are multiplied by the Koc values to demonstrate the preferential affinity of organic contaminants to organisms contacting these media. The maximum contaminant values for the groundwater medium are divided by the Koc values because the subsurface soils below the water table preferentially retard the contaminants from groundwater, and those chemicals with high Koc values retarded most.

Results of the evaluation of importance of contaminants are expressed as percent of total importance are presented in Table 7-40. For each environmental medium, the organic and inorganic contaminant with the greatest percent importance, based on concentration and toxicity, are evaluated further in this Ecological Assessment. These contaminants include the following:

- Surface soils
  - toluene
  - cadmium

- Sediments
  - bis(2-ethylhexyl)phthalate (DEHP)
  - mercury
- Surface water
  - 4-methylphenol
  - manganese
- Groundwater
  - 2-butanone
  - manganese

In addition, PCBs were considered because of their affinity for biological tissues and their percent importance based on chemical factors (Koc).

Tentatively identified compounds (TICs) were identified in media of environmental concern. Results of the TIC analyses are included in Tables 7-2 (shallow groundwater), 7-7 (surface soils), 7-9 (surface waters), and 7-10 (sediments). Concentrations of TICs are generally less than those of contaminants selected from the TCL for environmental media. Because of the generally lower concentrations and the lack of available toxicological data for developing RfDs for TICs, they are not quantitatively evaluated in the Ecological Assessment.

7.2.5 Exposure Assessment

7.2.5.1 Exposure Pathways

Biological populations are potentially exposed to Site contaminants. Potential exposure pathways for plant and animal populations at the Site and in the surrounding water and wetland areas are listed in Table 7-41.

Terrestrial Habitat

In the terrestrial environment of the Site, plant species may penetrate the cover soils and have root systems in contact with contaminated soils. Burrowing animals may also come into contact with contaminated soils by penetrating surface cover. Ground nesting birds and surface dwelling mammals, reptiles, and amphibians may also be exposed to contaminants that may be at the Site surface due to chemical migration or erosion of cover soils.

Although plant and animal species may absorb some contaminants by direct surface contact with soils, most exposure would be by ingestion of contaminants. Burrowing mammals and invertebrates could ingest soil in the course of movement through the soil. These and other species could also ingest soils incidentally in the course of consumption of soil-dwelling food species. Except for chemicals that bioaccumulate, the greatest exposure to terrestrial species would be the ingestion of contaminated soils.

Wetland Habitat

In the wetlands, potential sediment contamination may have resulted from erosion of soils from source areas or discharge of contaminated groundwater through the sediments. Plants in wetlands have the opportunity to extract contaminants, especially metals, from wetland sediments. Wetland mammals, birds, invertebrates (e.g., crayfish), and plants likely are exposed to subsurface water. These species and fish are exposed to wetland surface waters, when present.

The major role of contamination uptake for plant species is by surface absorption, which applies to bioaccumulative organic compounds and metals. For animal species, direct absorption of bioaccumulative contaminants occurs, but most species are exposed to contaminants by incidental ingestion of contaminated sediments.

Portions of wetlands seasonally may contain sufficient standing water to support fish species, as well as plants, invertebrates, and wetland mammals and birds. Plants (macrophytes and algae) can potentially be exposed to Site contaminants from surface water or sediment. Wetland mammals and birds, invertebrates, and fish have contact with water and sediments and can biomagnify contaminants through a foodchain.

Ditch Habitat

In the Site area, plants (including macrophytes and algae), fish, invertebrates, and wetland mammals and birds have direct contact with surface water in ditches. Macrophytes and animal species also may have contact with the sediments. Potential biomagnification of contaminants in foodchains may occur among the species present. Larger mammals, such as deer, may also have access to contaminants in the ditches.

7.2.5.2 Populations of Concern

The effects on populations representative of the Site area are considered to assess the effects of Site contaminants on the surrounding environment. Contaminants are assessed against specific endpoints of population parameters, such as growth or limits on reproduction. Ecological endpoints selected for representative species of concern are listed in Table 7-42.

Terrestrial habitats on-Site include approximately 1 to 2 acres of open field in the off-Site disposal area and the Kapica-Pazmey property, approximately 33 acres of landfill open area, and 2 to 4 acres of wooded land along Colfax Avenue. These areas likely support small mammal populations, including various species of field rats, mice, voles and woodchucks that live on the ground or burrow into or through it. Because many of these species are rodents, ecological endpoints developed for the laboratory rat are applied to assess the effects on these species. Assessment values are described for a burrowing rodent, which could apply to several species. For the burrowing rodent, incidental ingestion of soil and consumption of surface water (ditches) and shallow groundwater (wetland water) are assumed to be the primary routes of exposure.

The potential effects of Site contaminants and area wetlands are assessed by the assumption of the presence of mink (Mustela vison) at the Site. Although mink were not observed during the course of RI field activies, the F&WS requested consideration of this species because of the potential presence of mink habitat in the Site area and the toxicological data base available for this species. Mink are carnivorous wetland mammals sensitive to PCBs. Assessing the effects of PCBs on mink tests the effects of the most bioaccumulative contaminant detected at the Site on a species sensitive to PCBs. Because the other contaminants addressed in this assessment do not greatly bioaccumulate, and their primary route of uptake is direct ingestion, the effects of these contaminants on mink are not likely to be appreciable.

The contaminants selected for the assessment of surface water (including shallow groundwater) and sediment concentrations are applied to a fish species, the bluegill sunfish (Lepomis macrochirus). This species is common in northern Indiana surface waters. Although effects of environmental contaminants are well documented, most tests have assessed lethality to 50% of a test population (LC_{50}). For the contaminants considered in this ecological assessment, values for the onset of toxicity or for sublethal effects were not available. Ecological endpoints in Table 7-42 for aquatic species include effects on other species because these values are more sensitive to the contaminants than bluegill LC_{50} values. The contaminants in surface water (including shallow groundwater) and sediments are assumed to present the primary exposure to the bluegill in the course of feeding.

Exposure concentrations are estimated for representative species of concern from concentrations analyzed in media of concern. Estimates of intake rates or concentrations are presented in Tables 7-43, 7-45, and 7-46 for representative species. Calculations and assumptions for the burrowing rodent and the bluegill are presented in Table 7-44.

In addition to RfD values for rodent species, Table 7-47 includes values for the onset of toxicity to rodent species by the oral pathway (ingestion). The onset of toxicity values are one or more orders of magnitude greater than the animal species-specific RfD values.

7.2.6 Toxicity Assessment

Exposure of populations to contaminants at the site may result in toxicological effects. These effects vary by the level of contamination to the exposed populations. Documentation is available for various species for effects commonly ranging from the conservative No Observed Adverse Effect Level (NOAEL) to the more drastic LC_{50} (Lethal Concentration to 50% of a test population). Criteria pertinent to the ecological endpoints selected for the species of concern represent the conservative end of this range. Values for these parameters are included in Table 7-47.

Values for the onset of toxicity to bluegills are not available for the evaluated contaminants. Table 7-48 presents LC_{50} values to indicate concentrations that are toxic to a species of this assessment. The EE values included in Table 7-42 for aquatic species are more conservative than the bluegill LC_{50} values.

An approach to the assessment of sediment contaminants to biological populations has been the use of Apparent Effect Threshold values. This approach has been used in an estaurine study in Puget Sound (Tetratech, 1986). The generally most sensitive parameter in this study was reduction of total abundance of benthic infauna (macroinvertebrates). Results of this study for the contaminants of concern for this Ecological Assessment are included in Table 7-47.

Most animal species have sufficiently short life spans that a long term disease, such as cancer, is not in evidence in localized populations to the extent that it affects population densities. Information concerning the presence of specific endangered species, for which cancer effects may need to be addressed to protect a limited number of individuals, is not available. Therefore, the potential for cancer effects on animal species is not addressed in the Ecological Assessment.

7.2.7 Risk Characterization

Exposures of representative species of concern have been estimated for representative contaminants of concern. For the burrowing rodents, the exposures have been developed in the format of intake of contaminants expressed as a fraction of body weight per day (mg/kg-day) and are summarized in Table 7-43. The intakes are assumed for a lifetime, or chronic, exposure because the representative species have ranges that could be restricted to the Site or adjacent wetland or surface water.

Potential effects of the selected contaminants of concern have been summarized from the scientific literature. Results of chronic exposure (greater than or equal to a lifetime of the test species) have been included where such values are available. Endpoints of studies resulting in initial effects to the test populations, especially those effects on reproduction or population maintenance (e.g., teratogenic effects) have been evaluated, where possible. These ecological endpoints are included in Table 7-42. Other pertinent population data for the contaminants of concern are included in Table 7-47 as an indication of similar population parameters.

For the burrowing rodents, the exposure concentrations of the representative contaminants of concern, expressed as DI values, are compared to the ecological endpoints (EE) for population stability (e.g., reproduction effects, etc.), expressed as EE values, in Table 7-42. The comparisons are expressed as ratios of potential intake values to the population effect values, or CD/EE. This ratio results in a value defined for human health risk assessments (RAGS, Vol. I) as the Hazard Quotient (HQ) for the contaminants of concern to the selected species of concern. A summation of the HQs is performed for human populations to obtain an accumulative Hazard Index for the Site. For the Ecological Assessment, only representative contaminants of greatest concern were addressed to present an indication of potential ecological effects of Site contaminants. Therefore, a summary Hazard Index including all contaminants has not been developed. Hazard Quotient values for burrowing rodents are shown in Table 7-43.

A Hazard Quotient value of $\geq$ 1 indicates that the species of concern has an intake of a particular contaminant of concern at a dose rate that may be sufficient to affect the population stability of that species. Burrowing rodent populations may be adversely affected by Site soil contaminants, based on HQ values of 2.8 for toluene and 13 for cadmium, which represent the likely maximum values for shallow or surface soils. Exposure of these species to surface water (including shallow groundwater) and sediments is not likely to affect the populations, based on the HQ values for these media.

The exposure of mink to PCBs through biomagnification is addressed by assuming the concentrations in prey species are represented by concentrations in environmental media in which the prey occur, modified by the factors included in Table 7-45. For the mink, the sum of the predicted concentrations of PCBs in the food sources is considered as the animals intake. A value for a permissible tissue concentration for mink diet from the literature (Platonow and Karstad, 1973) is the EE which functions as the RfD. From these values, a HQ is derived as shown in Table 7-45. The HQ value of slightly greater than 1 indicates a potential stress to individual minks, but not likely to the species on the population level.

Because dose concentrations similar to those applied to the mammalian species are not available to develop RfD values for aquatic species, ecological endpoints are expressed as exposure concentrations in milligrams per liter. The time factor for the exposure concentrations is assumed to be on a daily basis. HQ values for bluegills are presented in Table 7-46. The values for the selected contaminants are low (HQ < 1), suggesting little likelihood of adverse impact to aquatic species from Site contaminants.

7.2.7.1 Water Quality Criteria

The U.S. EPA has developed Ambient Water Quality Criteria (AWQC) for the protection of freshwater life for PCBs, some organochlorine pesticides and heavy metals. In addition to these criteria, the U.S. EPA has used the Lowest Reported Toxic Concentration values for some volatile and semi-volatile organic compounds as criteria. The AWQC are presented in Tables 7-48 and 7-49.

Table 7-48 presents predicted surface water concentrations for contaminants detected in . .allow groundwater at the Site. Maximum contaminant concentrations are divided by retardation factors to produce predicted surface water values. As indicated in Table 7-48, excursions of AWQC are not predicted to occur as a result of groundwater discharge to the wetlands.

Maximum surface water concentrations are compared to both acute and chronic AWQC in Table 7-49. The chronic AWQC for PCB is exceeded. This excursion occurred at SW02, one of the ponds on the active ACS Facility. At other locations the AWQC is not exceeded. Chronic AWQC for five metals (chromium as hexavalent chromium, copper, iron, lead, and zinc) are exceeded. Two of these maximum concentrations also exceed acute AWQC (chormium as hexavalent chromium and copper). The excursions are by a factor of 1 to 2 1/2 times the AWQC value except for lead, for which the maximum concentration exceeded the AWQC by a factor of approximately 7.5. The AWQC are conservative values for the protection of aquatic life; excursions of some of these criteria by a factor of less than 10 may stress populations of some sensitive species.

7.2.7.2 Sediment Quality Criteria

Sediment quality criteria (SQC) can be developed on a site-specific basis to assess the potential toxicity of sediment levels of nonpolar organic compounds to benthic species. SQC are derived by the equilibrium partitioning procedure (U.S. EPA, undated). This procedure assumes that nonpolar organic compounds bound to sediment are in equilibrium with the water in the sediment pore space (i.e., pore water). Sediment pore water is assumed to be the primary medium of exposure to nonpolar organic compounds for sediment-dwelling aquatic organisms.

The partitioning procedure utilizes a partition coefficient to estimate the nonpolar organic compound concentration in pore water. A partition coefficient, defined as the ratio of the concentration of a substance in one medium to its concentration in another, can be applied to correlate a sediment concentration with a water concentration for a particular nonpolar organic compound. The partition coefficient for a substance between sediment organic carbon (OC) and water is referred to as a sediment water partition coefficient (K_{OC}) and is represented by the following equation.

$$K_{OC} = \frac{\text{mg substance/kg sediment OC}}{\text{mg substance/L water}}$$

The SQC represents the concentrations of a substance in sediment that will not result in adverse effects to aquatic life. The SQC is developed using the ambient water quality criterion (AWQC) and the K_{OC} for the substance. This following relationship is used to calculate a "safe" sediment concentration (i.e., SQC).

$$SQC = K_{OC} \times AWQC \times \% \text{ OC}$$

SQC are presented in Table 7-49. For organic compounds, derived chronic SQC are exceeded for DEHP, PCB, and heptachlor epoxide. The acute SQC for heptachlor epoxide is also exceeded. Heptachlor epoxide occurred in only one location, at SD08. This location is a small pond on the eastern side of Colfax Avenue. Sediment concentrations of DEHP do not appear to be likely to adversely affect feeding of burrowing rodents and fish species, as assessed by the HQ values for DEHP in Tables 7-45 and 7-46. The occurrence of the maximum concentration of PCBs in sediments at a concentration greater than the SQC may be correlated to biomagnification concerns for a potential mink population.

For metals, SQC can be developed where dissociation coefficients (K_d) are available. The K_d values can be a substituted for the K_{OC} values in the above equation. K_d values for two metals found in sediments at the ACS Site are available and include the percent organic carbon factor in the K_d value (Chapman, 1989). These factors, and their corresponding SQC, are presented for copper and mercury in Table 7-49. The SQC is not exceeded for copper and by a factor of less than 2 for mercury. Sediment concentrations of mercury do not appear to be likely to adversely effect the feeding of

burrowing rodents and fish species, as assessed by the HQ values for mercury in Tables 7-43 and 7-46.

7.2.7.3 Endangered Species and Significant Areas

The F&WS report suggests that the area around Griffith, Indiana may present habitat for several Federal or State endangered or threatened species. The historical use of the area for industrial and agricultural purposes, with their drastic modifications of the landscape, suggests that the continued presence of habitat for some of these sensitive species is no longer likely. Warzyn did not observe evidence of endangered or threatened species (observations of May 1990). U.S. F&WS personnel noted the presence of the king rail, a federally threatened bird. The F&WS anticipates the presence of other endangered or threatened species on Site based on observations of available habitat (Sparks, personal communications, 1991).

The ACS Site is not included as a designated area of special biological significance by the Indiana Department of Natural Resources (IDNR). Approximately 1.2 miles west of the Site is the Hoosier Prairie State Nature Preserve, a relatively undeveloped property managed by the IDNR.

7.2.8 Ecological Assessment Assumptions

The following is a summary of the assumptions used in the Ecological Assessment to select chemicals of ecological concern by medium and to assess risk to biota in the media of concern.

Media of Potential Concern at the Site

- Surficial soil samples at Kapica-Pazmey, sediment samples, ditch surface water samples, and shallow aquifer groundwater samples were considered to be applicable for media of ecological concern at the Site. Shallow groundwater chemical data were used to predict the impact of discharge of contaminated groundwater to wetlands surface water.

- Chemical concentrations for media of concern were represented by the upper bound 95% confidence limit of the geometric mean. TCL organics detected in media were selected as chemicals of potential concern, as were inorganics at greater than natural background concentrations. Tentatively identified compounds were not considered quantitatively in the Ecological Assessment.

- Chronic reference doses (RfDs) based on animal data are generally used for assessing the human toxicity of noncarcinogenic chemicals. These chronic reference doses were used, with modifications, as a means of estimating chemical toxicity to small mammals. The chronic human reference doses were divided by their uncertainty factors to arrive at an estimate of the appropriate chronic reference doses for the species (e.g., rat) that the human reference dose was based upon. For chronic reference doses that were developed based on subchronic animal data, the 10-fold uncertainty factor applied to estimate the chronic reference dose was retained.

- The soil organic carbon-water partition coefficient (Koc) was used as an estimate of the bioaccumulation potential and soil adsorption potential of the contaminants.

Selection of Chemicals of Potential Ecological Concern

- A screening method was used to assess the relative importance of the contaminants detected in media of potential concern based on the contaminant concentration, toxicity, and bioaccumulation potential. The chemical's concentration was multiplied by the inverse of the species-specific reference dose to determine its importance based on concentration and toxicity. The percentage of the total importance for each chemical within a given medium was calculated. For each medium, the organic and inorganic analyte with the greatest importance value was selected as a chemical of potential concern for quantitative risk assessment.

To calculate the importance of the contaminant based on its bioaccumulation potential, the chemical concentration was multiplied by the Koc for surface water, sediment, and surface soils. The groundwater chemical concentration was multiplied by the inverse of the Koc because chemicals that bioconcentrate would be very immobile in the aquifer and would therefore not be released to surface water. Because Koc values are not available for inorganic contaminants and soil-water partition coefficients could not be located for metals of potential concern, screening of inorganics based on bioaccumulation potential was not conducted.

Chemicals of Potential Concern-Toxicity

The following contaminants were the most important, based on toxicity and concentration; their respective reference doses are provided in parentheses in units of mg/kg/day:

Surface soil- toluene (20) and cadmium (0.04)

Sediment- bis(2-ethylhexyl)phthalate (2) and mercury (0.03)

Surface water- 2-butanone (5), 4-methylphenol(5), and manganese(10)

Terrestrial Risk Estimates

Risks were assessed to burrowing rodents using the following assumptions:

- Rat toxicity information was used
- Rat food intake and water ingestion rates were used
- It was assumed that the main route of exposure was through oral ingestion of soil and surface water. It was assumed the animal's diet consisted of 5% soil from the contaminated areas, and on-Site surface water was used as the sole drinking water source. It was assumed that ingestion of chemicals through food (e.g., plant material) was minor compared to the concentration ingested in soil or sediment.

Theoretical Burrowing Mammal Characteristics (based on the lab rat)

- Body weight = 0.250 kg
- Water consumption rate = 25 ml/day
- Food consumption rate = 15 grams/day
- Soil or sediment consumption rate = 750 mg/day
- Assume home range of animal is small and completely within the contaminated area.

Organic Chemicals of Potential Concern- Bioaccumulation Potential

The primary organic contaminant of concern based on bioaccumulation potential was determined to be PCBs for surface soil, sediment, and surface water.

To assess risks based on the bioaccumulation potential of PCBs, the mink was selected as the species of potential concern based on its high level in the food chain and its sensitivity to PCBs. It was assumed the mink ate primarily small game, and that based on the concentration of PCBs in surface water, the ingestion of surface water would not pose an appreciable pathway of exposure to mink in comparison to food sources.

- It was assumed the home range of the mink was 20 acres.
- A permissible mink diet PCB concentration of 0.64 mg/kg was used as the reference diet concentration that would be considered safe.
- It was assumed mink ate 90% small game and 10% wetland amphibians. It was assumed based on Site conditions that fish were not likely available for mink to ingest. The ditch was not expected to support fish populations, because of its shallow depth and likely anoxic conditions during hot summer months and after winter ice over.(1)
- It was assumed the mink ingested 1/20 of their diet of small game from Kapica-Pazmey and 19/20 of their small game from the wetlands, based on the size of these areas.
- It was assumed the the frequency of detection of PCBs in the wetlands sediment (6/18) and at Kapica-Pazmey soil (12/16) represent the frequency of ingestion of contaminated small game animals or amphibians within the respective areas.
- Bioaccumulation factors (BAF) of 0.07 (small game), and 0.22 (amphibians) were used to assess the bioaccumulation of PCBs in the respective animal groups due to sediment ingestion.(1)
- The predicted food concentration in each animal group for a specific area was calculated by multiplying the concentration of PCBs in the area (e.g., Kapica-Pazmey or wetlands), by the BAF, the proportion of the home range the area encompassed, and frequency of PCB detection in the area. The biota concentrations for each feeding area were added to get the home range concentration of PCBs in the diet for the specific animal group.

Aquatic Toxicity Estimates

The following contaminants were the most important based on toxicity and concentration; their respective reference doses are provided in parentheses in units of mg/kg for sediments and mg/L for surface water.

Sediment- bis(2-ethylhexyl)phthalate (57.5) and mercury (10.2)
Surface water- 2-butanone (1690), 4-methylphenol(4), and manganese(400)

- The sediment reference doses are based on a safe body burden of the chemical in mg/kg. This was estimated by multiplying the contaminant BCF in fish by the contaminant safe concentration in water.
- Reference doses for surface water represent safe concentrations of contaminants based on a bioassay conducted with water alone (i.e., no prey or sediment ingestion).

Risk were assessed to fish using the following assumptions:

- Fish toxicity information was used unless it was unavailable to derive reference doses. If fish data were not available, data on the most sensitive aquatic species that could be located in the available literature were utilized.
- Assumptions of a bluegill's sediment intake (i.e., 1000 mg/day) were used to assess risks due to sediment ingestion. Actual surface water chemical concentrations were used to assess the risk posed by the absorption of chemicals from surface water. If the shallow groundwater aquifer concentration divided by 100 (i.e., dilution and biodegradation factor) was greater than the actual surface water concentration of the chemical, it was used instead to represent the surface water concentration of the chemical in the wetland.
- It was assumed that the main route of contaminant exposure was through oral ingestion of sediment and dermal absorption from surface water. It was assumed that ingestion of contaminants through food (i.e., plant material and prey flesh) was minor compared to the concentration ingested in soil or sediment ingested directly, or indirectly through the ingestion of prey species (i.e., within the gastrointestinal track of the prey species).
- Fish body burdens, as a result of sediment ingestion, were calculated by dividing the product of the sediment concentration (mg/kg), the daily consumption rate of sediment (0.01 kg), and bioaccumulation factor (BAF; unitless) for the contaminant by the fish's weight (0.125 kg). It was assumed the fish ate this amount of sediment on a continuous basis (i.e., steady-state conditions were reached).

Theoretical Fish Characteristics (based on the bluegill)

- Body weight = 0.125 kg
- Food consumption rate = 10 grams/day
- Sediment consumption rate = 1000 mg/day
- Assume home range is small and completely within the contaminated area.

Footnote:

(1) In the main body of the Ecological Assessment text, the risk calculations for mink are presented using the assumptions Warzyn believes to be appropriate based on Site conditions. Footnotes are added as appropriate to present the mink risks using the U.S. Environmental Protection Agency's and Fish and Wildlife Service's assumptions. The following are the alternate assumptions requested by the agencies.

- Assume mink eat 40% small game, 25% fish, 25% crayfish, and 10% wetland amphibians.

- Bioaccumulation factors (BAF) of 0.07 (small game), 0.22 (amphibians), 7 (fish), 5 (crayfish) are used to assess the bioaccumulation of PCBs in these animal groups from sediment.

7.2.9 Summary of the ACS Ecological Assessment

The ACS Site includes some natural habitats as well as industrial properties. Although there is limited open surface water habitat, there are extensive wetlands on the Site and in the Site area. Terrestrial habitats include open areas on the new and old landfills and the Kapica-Pazmey property. Organic and inorganic contaminants likely to present the greatest hazard were evaluated for environmental media: surface soils, sediments, surface water, and shallow groundwater.

In terrestrial habitats, burrowing rodent populations exposed to maximum contaminant concentrations in soils at the Kapica-Pazmey property likely receive unacceptable exposures to concentrations of organic and inorganic contaminants, as represented by toluene and cadmium. Exposures of these populations to representative contaminants in sediments (DEHP, mercury), surface waters (4-methylphenol, manganese), and shallow groundwater (2-butanone, manganese), do not appear likely to present an environmental stress.

Limited open water areas do not appear to present ecological risks to fish species. Maximum concentrations for contaminants for sediments (DEHP, mercury), surface waters (4-methylphenol, manganese), and wetland waters (represented by shallow groundwater/2-butanone, manganese) are not likely to adversely affect bluegills, if populations of this species are present.

The potential for contaminant bioaccumulation is investigated by the evaluation of PCBs, a bioaccumulative contaminant, to mink, a wetland mammal sensitive to PCBs. If minks were present at the Site and consume a diet typically reported in the literature, they would not likely suffer adverse population effects.

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TABLE 7-39
INFORMATION FOR CHEMICALS DETECTED IN MEDIA OF POTENTIAL CONCERN
ACS Site, Griffith, Indiana

Compound	Media Chemical Concentrations				Chemical Toxicity and Chemistry Information (1)				
	Surface Soil (SS) (mg/kg)	Sediment (SD) (mg/kg)	Surface Water (SW) (mg/L)	Upper Aquifer (GW) (mg/L)	Spp.	UF	RfD Oral	Spp. RfD Oral	Koc (ml/g)
Chloromethane				6.80e-02			0.0e+00	0.0e+00	3.50e+01
Bromomethane					r	100	1.4e-03	1.4e-01	
Vinyl chloride				7.20e-01			0.0e+00	0.0e+00	5.70e+01
Chloroethane		1.16e-02	3.00e-02	2.00e+00			0.0e+00	0.0e+00	2.20e+00
Methylene chloride	2.00e-01	2.58e-02		3.80e-01	r	100	6.0e-02	6.0e+00	8.80e+00
Acetone	9.70e-01		3.80e-01	9.90e+01	r	100	1.0e-01	1.0e+01	2.20e+00
Carbon disulfide					rab	100	1.0e-01	1.0e+01	5.40e+01
1,1-Dichloroethene					r	100	9.0e-03	9.0e-01	6.50e+01
1,1-Dichloroethane	1.50e-01		2.00e-01	2.40e+00			0.0e+00	0.0e+00	3.00e+01
1,2-Dichloroethene (cis)	7.60e+00	5.60e-03	3.00e-03	4.00e-01	r	300	1.0e-02	3.0e+00	4.90e+01
1,2-Dichloroethene (trans)					m	100	2.0e-02	2.0e+00	
Chloroform	1.00e-02	5.93e-03			d	100	1.0e-02	1.0e+00	3.10e+01
1,2-Dichloroethane							0.0e+00	0.0e+00	1.40e+01
2-Butanone		8.86e-03	1.40e-01	2.20e+02	r	100	5.0e-02	5.0e+00	4.50e+00
1,1,1-Trichloroethane	9.00e-03	3.00e-03			gp	100	9.0e-02	9.0e+00	1.52e+02
Carbon tetrachloride					r	100	7.0e-04	7.0e-02	1.10e+02
Vinyl acetate							1.0e+00	0.0e+00	
Bromodichloromethane					m	100	2.0e-02	2.0e+00	
1,2-Dichloropropane	1.90e-02						0.0e+00	0.0e+00	5.10e+01
cis-1,3-Dichloropropene					r	1000	3.0e-04	3.0e-01	
Trichloroethene	1.70e+02			4.50e-02			0.0e+00	0.0e+00	1.26e+02
Dibromochloromethane					r	100	2.0e-02	2.0e+00	
1,1,2-Trichloroethane					m	100	4.0e-03	4.0e-01	5.60e+01
Benzene	3.20e+00	4.30e-01	4.60e-01	1.00e+02			0.0e+00	0.0e+00	8.30e+01
trans-1,3-Dichloropropene					r	100	3.0e-04	3.0e-02	
Bromoform					r	100	2.0e-02	2.0e+00	
4-Methyl-2-pentanone	2.70e+02		4.90e-02	5.40e+01	r	100	5.0e-02	5.0e+00	2.05e+01
2-Hexanone				1.80e+00			0.0e+00	0.0e+00	3.90e+00
Tetrachloroethene	7.90e+02			2.00e-01	m	100	1.0e-02	1.0e+00	3.64e+02
1,1,2,2-Tetrachloroethane							0.0e+00	0.0e+00	1.18e+02
Toluene	1.90e+04	4.89e-02	8.00e-03	2.30e+00	r	100	2.0e-01	2.0e+01	3.00e+02
Chlorobenzene	6.20e+00			9.60e-02	d	100	2.0e-02	2.0e+00	3.30e+02
Ethylbenzene	4.30e+03	1.31e-02	5.40e-03	1.10e+00	r	100	1.0e-01	1.0e+01	1.10e+03
Styrene	2.30e+01				d	100	2.0e-01	2.0e+01	1.89e+02
Xylenes (mixed)	2.30e+04	1.60e-02	3.50e-02	3.00e+00	r	100	2.0e+00	2.0e+02	3.30e+02
SEMIVOLATILES									
Phenol	2.80e+01	1.90e-01	4.50e-02	2.40e-01	r	100	6.0e-01	6.0e+01	1.42e+01
bis(2-Chloroethyl) ether		3.61e-01	7.70e-02	2.50e-01	m	100	0.0e+00	0.0e+00	1.39e+01
2-Chlorophenol					r	100	5.0e-03	5.0e-01	1.55e+01
1,3-Dichlorobenzene				3.00e-03			0.0e+00	0.0e+00	1.70e+03

TABLE 7-39
INFORMATION FOR CHEMICALS DETECTED IN MEDIA OF POTENTIAL CONCERN
ACS Site, Griffith, Indiana

Compound	Media Chemical Concentrations: Surface Soil (SS) (mg/kg)	Sediment (SD) (mg/kg)	Surface Water (SW) (mg/L)	Upper Aquifer (GW) (mg/L)	Chemical Toxicity and Chemistry Information (1): Spp.	UF	RfD Oral	Spp. RfD Oral	Koc (ml/g)
1,4-Dichlorobenzene				1.00e-02			0.0e+00	0.0e+00	1.70e+03
Benzyl Alcohol					r	100	3.0e-01	3.0e+01	1.2Ne+01
1,2-Dichlorobenzene	5.90e-01			3.30e-02	r	100	9.0e-02	9.0e+00	1.70e+03
2-Methylphenol	4.70e+00		5.00e-03	3.80e-02	r	100	5.1e-02	5.1e+00	5.00e+02
bis(2-Chloroisopropyl)ether		5.77e-01	2.90e-02	3.00e-01	m	100	4.0e-02	4.0e+00	6.10e+01
4-Methylphenol	4.60e+00	2.70e-01	5.90e-01	2.20e+00	r	100	5.0e-02	5.0e+00	5.00e+02
N-Nitroso-di-n-dipropylamine							0.0e+00	0.0e+00	
Hexachloroethane					r	100	1.0e-03	1.0e-01	
Nitrobenzene					m	1000	5.0e-04	5.0e-01	
Isophorone	9.70e+01		5.00e-03	3.50e-02	d	100	2.0e-01	2.0e+01	2.49e+01
2-Nitrophenol							0.0e+00	0.0e+00	
2,4-Dimethylphenol	4.90e+00	3.62e-01	1.00e-02	1.10e-01	m	300	2.0e-02	6.0e+00	4.20e+01
bis(2-Chloroethoxy)methane							0.0e+00	0.0e+00	
2,4-Dichlorophenol					r	100	3.0e-03	3.0e-01	3.80e+02
1,2,4-Trichlorobenzene							1.3e-03	0.0e+00	9.20e+03
Naphthalene	9.70e+01	3.57e-01		7.10e-02	r	1000	4.0e-03	4.0e+00	6.49e+02
4-Chloroaniline					r	300	4.0e-03	1.2e+00	
Hexachlorobutadiene					r	100	2.0e-03	2.0e-01	2.90e+04
4-Chloro-3-methylphenol			2.00e-03	5.00e-03			0.0e+00	0.0e+00	4.70e+01
2-Methylnaphthalene	5.60e+01	3.41e-01		2.70e-02			0.0e+00	0.0e+00	7.12e+02
Hexachlorocyclopentadiene					r	100	7.0e-03	7.0e-01	
2,4,6-Trichlorophenol							0.0e+00	0.0e+00	2.00e+03
2,4,5-Trichlorophenol	1.70e-01				r	300	1.0e-01	3.0e+01	8.90e+01
2-Chloronaphthalene							8.0e-02	0.0e+00	7.12e+02
2-Nitroaniline							0.0e+00	0.0e+00	
Dimethylphthalate	1.40e+00						1.0e+00	0.0e+00	4.03e+01
Acenaphthylene							0.0e+00	0.0e+00	2.50e+03
3-Nitroaniline							0.0e+00	0.0e+00	
Acenaphthene	3.60e-01				m	300	6.0e-02	1.8e+01	4.60e+03
2,4-Dinitrophenol					h	1000	2.0e-03	2.0e+00	
4-Nitrophenol							0.0e+00	0.0e+00	2.12e+01
Dibenzofuran	4.30e-01	2.30e-01					0.0e+00	0.0e+00	8.20e+02
2,4-Dinitrotoluene							0.0e+00	0.0e+00	4.50e+01
Diethylphthalate	5.00e+00			9.00e-03	r	100	8.0e-01	8.0e+01	1.42e+02
4-Chlorophenyl-phenylether							0.0e+00	0.0e+00	
Fluorene	6.20e-01	3.95e-01			m	300	4.0e-02	1.2e+01	7.30e+03
4-Nitroaniline							0.0e+00	0.0e+00	
4,6-Dinitro-2-methylphenol							0.0e+00	0.0e+00	
N-nitrosodiphenylamine	4.30e+00						0.0e+00	0.0e+00	4.70e+02
4-Bromophenyl-phenylether							0.0e+00	0.0e+00	8.20e+02
Hexachlorobenzene		1.40e-01			r	100	8.0e-04	8.0e-02	3.90e+03
Pentachlorophenol	1.50e+00	2.30e-01		3.00e-03	r	100	3.0e-02	3.0e+00	5.30e+04
Phenanthrene	4.30e+00	3.77e-01					0.0e+00	0.0e+00	1.40e+04

Compound	Media Chemical Concentra... Surface Soil (SS) (mg/kg)	Sediment (SD) (mg/kg)	Surface Water (SW) (mg/L)	Up. Aquifer (GW) (mg/L)	Spp.	UF	...ic ...ici RfD Oral	Sig. RfD Oral	Koc (ml/g)
...thracene	6.60e-01	1.00e-01					0.0e+00	0.0e+00	1.40e+04
i-n-butylphthalate	9.40e+01	1.70e-01		2.00e-03	r	100	1.0e-01	1.0e+01	1.70e+05
luoranthene	3.40e+00	5.24e-01			m	300	4.0e-02	1.2e+01	3.80e+04
yrene	2.30e+00	5.00e-01			m	300	3.0e-02	9.0e+00	3.80e+04
Butylbenzylphthalate	5.10e+01	1.70e-01			r	100	2.0e-01	2.0e+01	2.43e+03
3,3'-Dichlorobenzidine							0.0e+00	0.0e+00	
Benzo(a)anthracene(c)	2.40e+00	4.57e-01					0.0e+00	0.0e+00	1.38e+06
Chrysene(c)	1.30e+00	4.29e-01					0.0e+00	0.0e+00	2.00e+05
bis(2-ethylhexyl)phthalate	5.40e+02	5.07e+00		5.00e-02	gp	100	2.0e-02	2.0e+00	6.92e+02
Di-n-octyl Phthalate	3.80e+01				r	100	2.0e-02	2.0e+00	6.92e+02
Benzo(b)fluoranthene(c)	3.90e+00	6.24e-01					0.0e+00	0.0e+00	5.50e+05
Benzo(k)fluoranthene(c)	3.90e+00	6.36e-01					0.0e+00	0.0e+00	5.50e+05
Benzo(a)pyrene(c)	1.40e+00	4.18e-01					0.0e+00	0.0e+00	5.50e+06
Indeno(1,2,3-cd)pyrene(c)	8.20e-01	3.24e-01					0.0e+00	0.0e+00	1.60e+06
Dibenz(a,h)anthracene(c)	2.70e-01	2.00e-01					0.0e+00	0.0e+00	3.30e+06
Benzo(g,h,i)perylene	1.10e+00	3.59e-01					0.0e+00	0.0e+00	1.60e+06
Total-Carcinogenic PAHs	1.40e+01	3.09e+00					0.0e+00	0.0e+00	
PESTICIDE/PCB									
alpha-BHC							0.0e+00	0.0e+00	3.80e+03
beta-BHC							0.0e+00	0.0e+00	3.80e+03
delta-BHC							0.0e+00	0.0e+00	
gamma-BHC (Lindane)					r	100	3.0e-04	3.0e-02	1.08e+03
Heptachlor					r	300	5.0e-04	1.5e-01	
Aldrin	8.80e-02				r	100	3.0e-05	3.0e-03	9.60e+04
Heptachlor epoxide		2.66e-02					1.3e-05	0.0e+00	2.20e+02
Endosulfan I	4.20e-02				r	300	5.0e-05	1.5e-02	2.43e+06
Dieldrin							5.0e-05	0.0e+00	
4,4'-DDE							0.0e+00	0.0e+00	4.40e+06
Endrin					d	100	3.0e-04	3.0e-02	
Endosulfan II					r	300	5.0e-05	1.5e-02	
4,4'-DDD	1.50e-01						0.0e+00	0.0e+00	7.70e+05
Endosulfan sulfate							5.0e-05	0.0e+00	
4,4'-DDT					r	100	5.0e-04	5.0e-02	2.43e+05
Methoxychlor					r	100	5.0e-03	5.0e-01	
Endrin ketone							0.0e+00	0.0e+00	1.70e+03
alpha-Chlordane					r	100	6.0e-05	6.0e-03	
gamma-Chlordane					r	100	6.0e-05	6.0e-03	
Toxaphene							0.0e+00	0.0e+00	
Total - PCBs	3.29e+02	4.11e+00	8.40e-04	2.96e-02			0.0e+00	0.0e+00	5.30e+05

Total

TABLE 7-39
INFORMATION FOR CHEMICALS DETECTED IN MEDIA OF POTENTIAL CONCERN
ACS Site, Griffith, Indiana

Compound	Media Chemical Concentrations				Chemical Toxicity and Chemistry Information (1)				
	Surface Soil (SS) (mg/kg)	Sediment (SD) (mg/kg)	Surface Water (SW) (mg/L)	Upper Aquifer (GW) (mg/L)	Spp.	UF	RfD Oral	Spp. RfD Oral	Koc (ml/g)
METALS									
Aluminum	1.32e+04		9.60e-01	2.80e-01			0.0e+00	0.0e+00	
Antimony	8.48e+01				r	100	4.0e-04	4.0e-02	
Arsenic			4.50e-02	4.32e-02	r	1	4.0e+00	4.0e+00	
Barium	5.73e+03	7.12e-02	3.22e-01	1.84e+00	r	100	7.0e-02	7.0e+00	
Beryllium			2.69e-04	2.50e-04	r	100	5.0e-03	5.0e-01	
Cadmium (food/soil)	1.74e+02		7.20e-04	3.10e-03	r	1	4.0e-02	4.0e-02	
Chromium III					r	100	1.0e+00	1.0e+02	
Chromium VI	3.08e+03	4.54e-02	2.80e-02	3.90e-03	r	500	5.0e-03	2.5e+00	
Cobalt	1.48e+02						0.0e+00	0.0e+00	
Copper	4.47e+03	9.44e-02	1.90e-02				0.0e+00	0.0e+00	
Iron	7.01e+04		1.43e+01	2.18e+02			0.0e+00	0.0e+00	
Lead	1.42e+04		2.36e-02	4.60e-03			0.0e+00	0.0e+00	
Manganese	1.54e+03		1.85e+00	4.25e+00	r	100	1.0e-01	1.0e+01	
Mercury	9.58e+00	1.22e-03		1.70e-03	r	100	3.0e-04	3.0e-02	
Nickel	1.97e+02	2.06e-02	8.00e-02	5.30e-02	r	300	2.0e-02	6.0e+00	
Potassium			3.00e+01	9.58e+01			0.0e+00	0.0e+00	
Selenium	1.72e+01	5.73e-04	1.83e-03	6.20e-03			0.0e+00	0.0e+00	
Silver	2.48e+01				h		0.0e+00	0.0e+00	
Sodium			8.23e+01	4.44e+02			0.0e+00	0.0e+00	
Thallium				4.00e-03	r	300	7.0e-05	2.1e-02	
Vanadium	4.77e+01	3.45e-02		2.59e-02	r	0	7.0e-03	0.0e+00	
Zinc	1.58e+04		8.80e-02	8.86e-01	h		0.0e+00	0.0e+00	
Cyanide	6.62e+01			1.00e-02	r	500	2.0e-02	1.0e+01	

Notes:

- Chemical concentrations for media of concern are represented by the lower of the upper bound 95% confidence limit of the geometric mean or the maximum chemical concentration. TCL organics detected in media of concern were selected as chemicals of potenial concern as were inorganics above natural background concentrations (refer to Tables 5-1 through 5-3 in Appendix S).

- Toxicity information was obtained from the Health Effects Summary Tables (HEAST; U.S. EPA 1991). Chronic human reference doses (RfDs) based on animal data were used to assess small game chemical toxicity, with modification. The chronic human RfDs were divided by their respective uncertainty factor to arrive at an estimate of the appropriate chronic reference for the species (e.g., rat) which the human RfD was based upon. For chronic RfDs which were developed based on subchronic animal data, the 10-fold uncertainty factor applied to estimate the chronic RfD was retained.

- A detailed definition of the organic carbon/water partition coefficient (Koc), as well as

TABLE 7-39
INFORMATION FOR CHEMICALS DETECTED IN MEDIA OF POTENTIAL CONCERN
ACS Site, Griffith, Indiana

sources for values, is presented in Table 7-14 of this report.

Legend:

Spp. = species for which the human RfD was based
r= rat
rab= rabbit
m= mouse
d= dog
gp= guinea pig
h= human

UF= uncertainty factor associated with RfD, less the 10 fold factor to extrapolate from subchronic to chronic effects studies.
RfD oral = human oral reference dose
Spp. RfD oral = Species-specific oral reference dose
Koc= soil organic carbon/water partition coefficient

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TABLE 7-40
SELECTION OF CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN
ACS Site, Griffith, Indiana

Compound	Screening Based on Chemical Concentration and Toxicity: Importance Factor SS	SD	SW	GW	Percent of Total Importance SS	SD	SW	GW	Screening Based on Chemical Concentration and Chemistry: Importance Factor SS	SD	SW	GW	Percent of Total Importance SS	SD	SW	GW
Chloromethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	1.9e-03	0	0	0	0
Bromomethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Vinyl chloride	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	1.3e-02	0	0	0	0
Chloroethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	2.6e-02	6.6e-02	9.1e-01	0	0	0	1
Methylene chloride	3.3e-02	4.3e-03	0.0e+00	6.3e-02	0	0	0	0	1.8e+00	2.3e-01	0.0e+00	4.3e-02	0	0	0	0
Acetone	9.7e-02	0.0e+00	3.8e-02	9.9e+00	0	0	18	15	2.1e+00	0.0e+00	8.4e-01	4.5e+01	0	0	8	45
Carbon disulfide	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,1-Dichloroethene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,1-Dichloroethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	4.5e+00	0.0e+00	6.0e-02	8.0e-02	0	0	0	0
1,2-Dichloroethene (cis)	2.5e+00	1.9e-03	1.0e-03	1.3e-01	0	0	0	0	3.7e+02	2.7e-01	1.5e-01	8.2e-03	0	0	0	0
1,2-Dichloroethene (trans)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Chloroform	1.8e-02	5.9e-03	0.0e+00	0.0e+00	0	0	0	0	3.1e-01	1.8e-01	0.0e+00	0.0e+00	0	0	0	0
1,2-Dichloroethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2-Butanone	0.0e+00	1.8e-03	2.8e-02	4.4e-01	0	0	14	67	0.0e+00	4.0e-02	6.3e-01	4.9e+01	0	0	0	49
1,1,1-Trichloroethane	1.0e-03	3.3e-04	0.0e+00	0.0e+00	0	0	0	0	1.4e+00	4.6e-01	0.0e+00	0.0e+00	0	0	0	0
Carbon tetrachloride	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Vinyl acetate	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Bromodichloromethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,2-Dichloropropane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	9.7e-01	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
cis-1,3-Dichloropropene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Trichloroethene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	2.1e+04	0.0e+00	0.0e+00	3.6e-04	0	0	0	0
Dibromochloromethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,1,2-Trichloroethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Benzene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	2.7e+02	3.4e+01	3.8e+01	1.2e+00	0	0	5	1
trans-1,3-Dichloropropene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Bromoform	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4-Methyl-2-pentanone	5.4e+01	0.0e+00	9.8e-03	1.1e+01	2	0	5	16	5.5e+03	0.0e+00	1.0e+00	2.6e+00	0	0	0	3
2-Hexanone	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	4.6e-01	0	0	0	0
Tetrachloroethene	7.9e+02	0.0e+00	0.0e+00	2.0e-01	29	0	0	0	2.9e+05	0.0e+00	0.0e+00	5.5e-04	0	0	0	0
1,1,2,2-Tetrachloroethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Toluene	9.5e+02	2.4e-03	4.0e-04	1.2e-01	35	0	0	0	5.7e+06	1.5e+01	2.4e+00	7.7e-03	2	0	0	0
Chlorobenzene	3.1e+00	8.0e+00	0.0e+00	4.8e-02	0	0	0	0	2.0e+03	0.0e+00	0.0e+00	2.9e-04	0	0	0	0
Ethylbenzene	4.3e+02	1.3e-03	5.4e-04	1.1e-01	16	0	0	0	4.7e+06	1.4e+01	5.9e+00	1.0e-03	2	0	1	0
Styrene	1.2e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	4.3e+03	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Xylenes (mixed)	1.2e+02	8.0e-05	1.8e-04	1.5e-02	4	0	0	0	7.6e+06	5.3e+00	1.2e+01	9.1e-03	3	0	1	0
SEMIVOLATILES																
Phenol	4.7e-01	3.2e-03	7.5e-04	4.0e-03	0	0	0	0	4.0e+02	2.7e+00	6.4e-01	1.7e-02	0	0	0	0
bis(2-Chloroethyl) ether	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	5.0e+00	1.1e+00	1.8e-02	0	0	0	0
2-Chlorophenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,3-Dichlorobenzene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	1.6e-06	0	0	0	0
1,4-Dichlorobenzene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	5.9e-06	0	0	0	0
Benzyl Alcohol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,2-Dichlorobenzene	6.6e-02	0.0e+00	0.0e+00	3.7e-03	0	0	0	0	1.0e+03	0.0e+00	0.0e+00	1.9e-05	0	0	0	0
2-Methylphenol	9.2e-01	0.0e+00	9.8e-04	7.5e-05	0	0	0	0	2.4e+03	0.0e+00	2.5e+00	7.6e-05	0	0	0	0

TABLE 7-40
SELECTION OF CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN
ACS Site, Griffith, Indiana

Compound	Screening Based on Chemical Concentration and Toxicity: Importance Factor SS	SD	SW	GW	Percent of Total Importance SS	SD	SW	GW	Screening Based on Chemical Concentration and Chemistry: Importance Factor SS	SD	SW	GW	Percent of Total Importance SS	SD	SW	GW
bis(2-Chloroisopropyl)ether	0.0e+00	1.4e-01	7.3e-03	7.5e-02	0	3	4	0	0.0e+00	3.5e+01	1.8e+00	4.9e-03	0	0	0	0
4-Methylphenol	9.2e-01	5.4e-02	1.2e-01	4.4e-01	0	1	57	1	2.3e+03	1.4e+02	3.0e+02	4.4e-03	0	0	37	0
N-Nitroso-di-n-dipropylamine	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Hexachloroethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Nitrobenzene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Isophorone	4.9e+00	0.0e+00	2.5e-04	1.8e-03	0	0	0	0	2.4e+03	0.0e+00	1.2e-01	1.4e-03	0	0	0	0
2-Nitrophenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2,4-Dimethylphenol	8.2e-01	6.0e-02	1.8e-03	1.8e-02	0	1	1	0	2.1e+02	1.5e+01	4.5e-01	2.6e-03	0	0	0	0
bis(2-Chloroethoxy)methane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2,4-Dichlorophenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,2,4-Trichlorobenzene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Naphthalene	2.4e+01	8.9e-02	0.0e+00	1.8e-02	1	2	0	0	6.3e+04	2.3e+02	0.0e+00	1.1e-04	0	0	0	0
4-Chloroaniline	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Hexachlorobutadiene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4-Chloro-3-methylphenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	9.4e-02	1.1e-04	0	0	0	0
2-Methylnaphthalene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	4.0e+04	2.4e+02	0.0e+00	3.8e-05	0	0	0	0
Hexachlorocyclopentadiene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2,4,6-Trichlorophenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2,4,5-Trichlorophenol	5.7e-03	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.5e+01	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2-Chloronaphthalene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2-Nitroaniline	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Dimethylphthalate	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	5.6e+01	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Acenaphthylene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
3-Nitroaniline	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Acenaphthene	2.0e-02	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.7e+03	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2,4-Dinitrophenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4-Nitrophenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Dibenzofuran	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	3.5e+02	1.9e+02	0.0e+00	0.0e+00	0	0	0	0
2,4-Dinitrotoluene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Diethylphthalate	6.3e-02	0.0e+00	0.0e+00	1.1e-04	0	0	0	0	7.1e+02	0.0e+00	0.0e+00	6.3e-05	0	0	0	0
4-Chlorophenyl-phenylether	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Fluorene	5.2e-02	3.3e-02	0.0e+00	0.0e+00	0	1	0	0	4.5e+03	2.9e+03	0.0e+00	0.0e+00	0	0	0	0
4-Nitroaniline	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4,6-Dinitro-2-methylphenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
N-nitrosodiphenylamine	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	2.0e+03	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4-Bromophenyl-phenylether	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Hexachlorobenzene	0.0e+00	1.8e+00	0.0e+00	0.0e+00	0	36	0	0	0.0e+00	5.5e+02	0.0e+00	0.0e+00	0	0	0	0
Pentachlorophenol	5.0e-01	7.7e-02	0.0e+00	1.0e-03	0	2	0	0	8.0e+04	1.2e+04	0.0e+00	5.7e-08	0	0	0	0
Phenanthrene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	6.0e+04	5.3e+03	0.0e+00	0.0e+00	0	0	0	0
Anthracene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	9.2e+03	1.4e+03	0.0e+00	0.0e+00	0	0	0	0
Di-n-butylphthalate	9.4e+00	1.7e-02	0.0e+00	2.0e-04	0	0	0	0	1.6e+07	2.9e+04	0.0e+00	1.2e-08	7	0	0	0
Fluoranthene	2.8e-01	4.4e-02	0.0e+00	0.0e+00	0	1	0	0	1.3e+05	2.0e+04	0.0e+00	0.0e+00	0	0	0	0
Pyrene	2.6e-01	5.6e-02	0.0e+00	0.0e+00	0	1	0	0	8.7e+04	1.9e+04	0.0e+00	0.0e+00	0	0	0	0
Butylbenzylphthalate	2.6e+00	8.5e-03	0.0e+00	0.0e+00	0	0	0	0	1.2e+05	4.1e+02	0.0e+00	0.0e+00	0	0	0	0
[illegible]idine	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
[illegible]	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	3.3e+06	6.3e+05	0.0e+00	0.0e+00	1	0	0	0
[illegible]	[illegible]	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	2.6e+05	8.6e+04	0.0e+00	0.0e+00	0	1	0	0

TABLE 7-40
SELECTION OF CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN
ACS Site, *Griffith, Indiana*

	Screening Based on Chemical Concentration and Toxicity								Screening Based on Chemical Concentration and Chemistry							
	Importance Factor				Percent of Total Importance				Importance Factor				Percent of Total Importance			
Compound	SS	SD	SW	GW	SS	SD	SW	GW	SS	SD	SW	GW	SS	SD	SW	GW
bis(2-ethylhexyl)phthalate	2.7e+02	2.5e+00	0.0e+00	2.5e-02	10	52	0	0	3.7e+05	3.5e+03	0.0e+00	7.2e-05	0	0	0	0
Di-n-octyl Phthalate	1.9e+01	0.0e+00	0.0e+00	0.0e+00	1	0	0	0	2.6e+04	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Benzo(b)fluoranthene(c)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	2.1e+06	3.4e+05	0.0e+00	0.0e+00	1	4	0	0
Benzo(k)fluoranthene(c)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	2.1e+06	3.5e+05	0.0e+00	0.0e+00	1	5	0	0
Benzo(a)pyrene(c)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	7.7e+06	2.3e+06	0.0e+00	0.0e+00	3	30	0	0
Idene(1,2,3-cd)pyrene(c)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.3e+06	5.2e+05	0.0e+00	0.0e+00	1	7	0	0
Dibenz(a,h)anthracene(c)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	8.9e+05	6.6e+05	0.0e+00	0.0e+00	0	9	0	0
Benzo(g,h,i)perylene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.8e+06	5.7e+05	0.0e+00	0.0e+00	1	7	0	0
Total-Carcinogenic PAHs	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
PESTICIDE/PCB																
alpha-BHC	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
beta-BHC	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
delta-BHC	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
gamma-BHC (Lindane)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Heptachlor	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Aldrin	2.9e+01	0.0e+00	0.0e+00	0.0e+00	1	0	0	0	8.4e+03	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Heptachlor epoxide	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	5.9e+00	0.0e+00	0.0e+00	0	0	0	0
Endosulfan I	2.8e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.0e+05	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Dieldrin	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4,4'-DDE	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Endrin	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Endosulfan II	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4,4'-DDD	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.2e+05	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Endosulfan sulfate	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4,4'-DDT	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Methoxychlor	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Endrin ketone	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
alpha-Chlordane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
gamma-Chlordane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Toxaphene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Total - PCBs	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.7e+08	2.2e+06	4.5e+02	5.6e-08	76	28	55	0
	2712.48	4.88693	0.20695	65.9789	100	100	100	100	2.3e+08	7731889	807.668	99.3121	100	100	100	100
METALS																
Aluminum	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Antimony	2.1e+03	0.0e+00	0.0e+00	0.0e+00	23	0	0	0								
Arsenic	0.0e+00	0.0e+00	1.1e-02	1.1e-02	0	0	4	1								
Barium	8.2e+02	1.0e-02	4.6e-02	2.6e-01	9	14	16	25								
Beryllium	0.0e+00	0.0e+00	5.4e-04	5.0e-04	0	0	0	0								
Cadmium (food/soil)	4.4e+03	0.0e+00	1.8e-02	7.8e-02	48	0	6	7								
Chromium III	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Chromium VI	1.2e+03	1.8e-02	1.1e-02	1.6e-03	14	25	4	0								
Cobalt	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Copper	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								

SELECTION OF CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN
ACS Site, Griffith, Indiana

Compound	Screening Based on Chemical Concentration and Toxicity: Importance Factor SS	SD	SW	GW	Percent of Total Importance SS	SD	SW	GW	Screening Based on Chemical Concentration and Chemistry: Importance Factor SS	SD	SW	GW	Percent of Total Importance SS	SD	SW	GW
Iron	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Lead	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Manganese	1.5e+02	0.0e+00	1.9e-01	4.3e-01	2	0	65	41								
Mercury	3.2e+02	4.1e-02	0.0e+00	5.7e-02	4	56	0	5								
Nickel	3.3e+01	3.4e-03	1.3e-02	8.8e-03	0	5	5	1								
Potassium	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Selenium	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Silver	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Sodium	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Thallium	0.0e+00	0.0e+00	0.0e+00	1.9e-01	0	0	0	18								
Vanadium	0.0e+00	0.0e+00	0.0e+00	8.0e+00	0	0	0	0								
Zinc	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Cyanide	6.6e+00	0.0e+00	0.0e+00	1.0e-03	0	0	0	0								
	9030.69	0.0726	0.28526	1.03519	100	100	100	100								

Notes:

1. The importance of each chemical was estimated using a screening procedure which utilized the chemical's concentration, toxicity potential, and bioaccumulation potential (organic chemicals only).

a. To assess the chemical's importance based on concentration and toxicity, the chemical's concentation was multiplied by the inverse of the species-specific reference dose (refer to Table 7-39 for data). The percentage of the total importance for each chemical within a given medium was calculated.

b. To assess each chemical's importance based on its bioaccumulation potential, the chemicals concentration (i.e., surface water, sediment, or surface soils) was multiplied by chemical's Koc. The groundwater chemical concentration was multiplied by the inverse of the chemical's Koc, because chemicals that bioconcentrate would be immobile in the aquifer and would therefore not be released to surface water.

An appropriate indicator of bioaccumulation potential could not be located for inorganic chemicals, therefore, screening for inorganics based on their bioaccumulation potential could not be made.

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MJK/mvk/JFK

TABLE 7-41

Potential Ecological Exposure Pathways
ACS Site, Griffith, Indiana

Potential Source (Environmental Medium)	Exposure Point	Route of Contaminant Uptake	Exposed Population	Exposure Potential
Surface water	Ditches	Surface absorption	Fish, algae, macrophytes, aquatic birds, macroinvertebrates, reptiles, amphibians	Low, little uptake of contaminants occurs by surface adsorption.
		Ingestion	Fish, aquatic birds, macro-invertebrates, reptiles, amphibians	High, some organics and metals bioaccumulate and biomagnify.
Surface water	Wetlands	Surface absorption	macrophytes, algae, macroinvertebrates, aquatic birds, reptiles	Low, little uptake of contaminants occurs by surface adsorption.
Sediment	Ditches	Surface absorption	Macrophytes, macroinvertebrates	High, some organics and metals bioaccumulate and biomagnify.
		Ingestion	Fish, aquatic birds, macroinvertebrates	High, some organics and metals bioaccumulate and biomagnify.
Sediment	Wetlands	Surface absorption	Macrophytes, macroinvertebrates	High, some organics and metals bioaccumulate and biomagnify.
Biota	Ditches	Biomagnification	Fish, small mammals, reptiles, aquatic birds	High, some organics and metals bioaccumulate and biomagnify.
Biota	Wetlands	Biomagnification	Small mammals, birds	High, some organics and metals bioaccumulate and biomagnify.
Soil	Shallow soils	Surface absorption, ingestion	Burrowing mammals, reptiles	High, uptake may occur from incidental ingestion of soils.
Biota	Shallow soils	Biomagnification	Small mammals, birds, reptiles	High, some organics and metals bioaccumulate and biomagnify.

JFK/vlr/JFK
[mal-401-89]
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TABLE 7-42

Ecological Endpoints for Representative Species of Concern
ACS Site, Griffith, Indiana

Exposure Route	Selected Species and Contaminant	Ecological Endpoint	Test Species	Concentration (EC)	Reference
Ingestion of soil, water	Terrestrial species - burrowing rodent				
	2-butanone	Fetotoxicity	rat	4.6e+01 mg/kg-day	U.S. EPA, 1991
	toluene	Changes in liver and kidney weights	rat	2.2e+02 mg/kg-day	U.S. EPA, 1991
	4-methylphenol	Reduced body weight gain	rat	5.0e+01 mg/kg-day	U.S. EPA, 1991
	DEHP	Increased relative liver weight	guinea pig	1.9e+01 mg/kg-day	U.S. EPA, 1991
	Cadmium	Decreased survival	rat	3.9e-01 mg/kg-day	U.S. EPA, 1984
	Manganese	Reproductive effects	rat	5.2e+01 mg/kg-day	U.S. EPA, 1989
	Mercury	Kidney effects	rat	5.6e-01 mg/kg-day	U.S. EPA, 1991
Biomagnification from prey	Wetland species - mink				
	PCB	Onset of liver effects	mink	6.4e-01 mg/kg	Platonow and Karstad, 1973
Ingestion of sediment, water	Aquatic species - bluegill				
	2-butanone	Cell multiplication inhibition	bluegreen algae	1.1e+02 mg/L	Verschueren, 1983
	4-methylphenol	Onset of lethality (LD_0)	green algae	6.0e+00 mg/L	Verschueren, 1983
	DEHP	No effect on number of progeny	freshwater crustaceans	1.2e-01 mg/L	Dillon, 1984
	Manganese	Onset of mutation	*E. coli*	4.0e+02 mg/L	Sax, 1984
	Mercury	Spawning completely inhibited	minnow	1.0e-03 mg/L	Dillon, 1984

JFK/ccf/JFK
[mad-401-89a]

TABLE 7-43

Health Based Risk Estimates For Small Burrowing Rodents
ACS Site, Griffith, Indiana

Chemical	Concentration (mg/kg) (from Table 7-39)	Daily Intake (mg/kg/day) (from Table 7-44)	Reference Dose (mg/kg/day) (from Table 7-39)	Hazard Quotient (unitless)
Surface Soil				
Toluene	1.9e+04	5.7e+01	2.0e+01	2.8e+00
Cadmium	1.7e+02	5.2e-01	4.0e-02	1.3e+01
Total Risk				2.0e+01
Sediment				
DEHP	5.1e+00	1.5e-02	2.0e+00	7.5e-03
Mercury	1.2e-03	3.6e-06	3.0e-02	1.2e-04
Total Risk				8.0e-03
Surface Water(1)				
2-Butanone	2.2e+00	2.2e-01	5.0e+00	4.4e-02
4-Methylphenol	5.9e-01	5.9e-02	5.0e+00	1.2e-02
Manganese	1.8e+00	1.8e-01	1.0e+01	1.8e-02
Total Risk				7.0e-02

Notes:

- The health risk estimates are calculated to represent the approximate risk to small burrowing mammals (e.g., mice, voles, rats, ground squirrels, woodchucks). The risk estimates are calculated based on rat toxicity information and daily food and water consumption rates.
- A hazard quotient greater than 1 indicates that exposure to the contaminant may cause deleterious health effects. Total risk hazard quotients are reported to one significant figure (e.g., 2.8 + 13.1 = 20).

Footnote:

1. Surface water chemical concentrations are used to calculate health risks to this medium unless the upper aquifer chemical concentration exceeds the surface water chemical concentration by more than 100-fold. When this occurs (i.e., 2-butanone), the groundwater chemical concentration is divided by 100 and used to represent the surface water chemical concentration as a result of groundwater discharge to the wetland. The 100-fold factor represents a 10-fold biodegradation factor and 10-fold dilution factor.

Legend:

DEPH= Bis(2-ethylhexyl)phthalate

MWK/ccf/JFK
[mad-401-89b]
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TABLE 7-44

Calculation of Daily Intakes For Burrowing Mammals and Fish Body Burdens

Burrowing Mammals Daily Intakes

Soil and Sediment-Ingestion

$$DI = \frac{CS \times IR \times CF \times FI}{BW}$$

DI = Daily Intake, mg/kg/day
CS = Soil or Sediment Chemical Concentration, mg/kg
IR = Soil or Sediment Ingestion Rate, 750 mg Soil or Sediment/day
CF = Conversion Factor, 10^{-6} kg/mg
FI = Fraction Ingested from Contaminated Area, 1 (i.e., 100%)
BW = Body Weight, 0.250 kg

Surface Water-Ingestion

$$DI = \frac{CW \times CR}{BW}$$

DI = Daily Intake, mg/kg/day
CW = Surface Water Chemical Concentration, mg/L
CR = Surface Water Consumption Rate, 0.025 L/day
BW = Body Weight, 0.250 kg

Fish Body Burdens

Sediment-Ingestion

$$BB = \frac{CS \times IR \times BAF}{BW}$$

BB = Fish chemical body burden due to sediment ingestion, mg/kg
CS = Sediment chemical concentration, mg/kg
IR = Daily sediment consumption; 0.001 kg
BAF = Bioaccumulation factor, 0.5 (organics) or 0.1 (inorganics)
BW = Body weight, 0.125 kg

Note:

- The exposure factors (e.g., IR, BW, CR) were based on the size and feeding habits of an adult male rat. It was assumed that a rat diet consisted of 5% soil or sediment by weight (i.e., 750 mg soil or sediment). The average rat weighs 0.250 kg, and eats 15 grams food and drinks 25 ml of water per day.

MWK/ccf/JFK
[mad-400-01a]
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TABLE 7-45

Predicted Food Source PCB Concentrations for Mink
and Related Health Risks
ACS Site, Griffith, Indiana

od ource (Area)	Exposure Point Concentration (mg/kg) (from Table 7-39)	BAF	Proportion of Home Range	Fraction Contaminated	Predicted (1) Concentration in Food Source (mg/kg)
a! Game (Kapica-Pazmey)	3.3e+02	0.07	1/20	12/16	6.6e-01
Game (Wetlands)	4.0e+00	0.07	19/20	6/18	9.0e-02
, Game (Home Range)					9.5e-01
bians (Wetlands)	4.0e+00	0.22	19/20	6/18	2.8e-01
bians (Home Range)					2.8e-01
ll Diet (Home Range)(2)					8.9e-01
ssible Diet Concentration					6.4e-01
d Quotient					1 (3)

note:

The concentration of PCBs in a particular food source is estimated by the product of the exposure point concentration (i.e., wetlands sediment or Kapica-Pazmey surface soil PCB concentration) x BAF x proportion of the total home range represented by the site area x the fraction of the area that is contaminated with PCBs. The contributions from each area are summed to arrive at an average home range concentration of PCBs in a specific food source (e.g., small game).

(2) It is assumed that a mink's diet consists primarily of small game (i.e., 90%) and amphibians (10%). The overall diet concentration of PCBs are estimated using the following equation:

$$\text{Overall diet PCB concentration (mg/kg)} = \underline{\text{Small Game}}\ (0.95 \times 0.9) + \underline{\text{Amphibians}}\ (0.28 \times 0.1) = 0.89$$

Based on Platonow and Karstad (1973), the permissible tissue PCB concentration of a mink diet is 0.64 mg/kg. The predicted concentration of the mink's diet (0.89 mg/kg) marginally exceeds this limit; therefore, there is a low potential for PCB exposure to cause health effects in mink that potentially live in the contaminated area (i.e., HQ not much greater than 1)

end

BAF - Bioaccumulation Factor

te:

U.S. EPA assumptions provide that a mink's diet consists primarily of small game (40%), fish (25%), crayfish (25%), and amphibians (10%). The overall diet concentration of PCBs is estimated using the following equation and the home range food source concentrations listed above:

$$\text{erall diet PCB concentrations} = \underline{\text{Small Game}}\ (0.95 \times 0.4) + \underline{\text{Amphibians}}\ (0.28 \times 0.1) + \underline{\text{Fish}}\ (8.9 \times 0.25) + \underline{\text{Crayfish}}\ (6.3 \times 0.25) = 4.2$$

Based on Platonow and Karstad (1973), the permissible tissue PCB concentration of a nk diet is 0.64 mg/kg. The predicted concentration of the mink's diet (4.2 mg/kg) ised on U.S. EPA assumptions produces a HQ=7.

MWK/ccf/JFK/DWH
[mad-401-89d]
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TABLE 7-47

Toxicity Criteria for Selected Contaminants of Concern
ACS Site, Griffith, Indiana

Contaminant	Oral Chronic RDF (from U.S. EPA, 1991) Value(1)	Effect	Species	Rat Oral LD_{50} (mg/kg) (from Sax, 1984)	Threshold (mg/l) (from TetraTech, 1986)	Apparent Effects Threshold LC^{50} (mg/l) (from Verschueren, 1983)
2-butanone	5.0e + 00 mg/kg-day	Fetotoxicity	rat	2.0e + 03 (ipr-guinea pig)	-	1.7e + 03
DEHP	2.0e + 00 mg/kg-day	Increased relative liver weight	guinea pig	3.5e + 01	1.9e + 00	> 7.7e + 02
4-methylphenol	5.0e + 00 mg/kg-day	Reduced body weight gain	rat	2.1e + 02(LD_{50})	6.7e-01	1.9e + 01 (fathead minnow)
Toluene	2.0e + 01 mg/kg-day	Changes in liver and kidney weight	rat	9.0e + 03 (mouse)	-	2.4e + 01
PCB	-	-	-	9.0e + 01	1.1e + 00	
Cadmium	4.0e-02 mg/kg-day	Decreased survival	rat	4.5e + 02 (mouse)	5.8e + 00	
Manganese	1.0e + 01 mg/kg-day	Reproductive effects	rat	1.0e + 03	> 1.0e + 03	
Mercury	3.0e-02 mg/kg-day	Kidney effects	rat	4.0e + 02 (ipr)	8.8e-01	7.6e + 00

(1) Factors for animal to human species and average to most sensitive individual have been removed.

JFK/ref/JFK
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TABLE 7-48
COMPARISON OF AMBIENT WATER QUALITY CRITERIA TO PREDICTED SURFACE WATER CONCENTRATIONS
ACS Site, Griffith, Indiana

Compound	Upper Aquifer (mg/L)	Predicted Surface Water (mg/L)	Koc (ml/g)	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic
Chloromethane	6.80e-02	1.8e-04	3.50e+01				
Bromomethane		0.0e+00					
Vinyl chloride	7.20e-01	1.3e-03	5.70e+01				
Chloroethane	2.00e+00	1.7e-02	2.20e+00				
Methylene chloride	3.80e-01	2.2e-03	8.80e+00	1.9e+02			
Acetone	9.90e+01	8.4e-01	2.20e+00				
Carbon disulfide		0.0e+00	5.40e+01				
1,1-Dichloroethene		0.0e+00	6.50e+01				
1,1-Dichloroethane	2.40e+00	6.9e-03	3.00e+01				
1,2-Dichloroethene (cis)	4.00e-01	7.9e-04	4.90e+01	1.4e+02			
1,2-Dichloroethene (trans)		0.0e+00					
Chloroform		0.0e+00	3.10e+01	2.9e+01	1.2e+00		
1,2-Dichloroethane		0.0e+00	1.40e+01	1.2e+02	2.0e+01		
2-Butanone	2.20e+02	1.6e+00	4.50e+00				
1,1,1-Trichloroethane		0.0e+00	1.52e+02	5.3e+01			
Carbon tetrachloride		0.0e+00	1.10e+02				
Vinyl acetate		0.0e+00					
Bromodichloromethane		0.0e+00					
1,2-Dichloropropane		0.0e+00	5.10e+01	2.3e+01	5.7e+00		
cis-1,3-Dichloropropene		0.0e+00					
Trichloroethene	4.50e-02	4.0e-04	1.26e+02	4.5e+01	2.2e+01		
Dibromochloromethane		0.0e+00					
1,1,2-Trichloroethane		0.0e+00	5.60e+01				
Benzene	1.00e+02	1.3e-01	8.30e+01	5.3e+00			
trans-1,3-Dichloropropene		0.0e+00					
Bromoform		0.0e+00					
4-Methyl-2-pentanone	5.40e+01	2.0e-01	2.05e+01				
2-Hexanone	1.80e+00	1.4e-02	3.90e+00				
Tetrachloroethene	2.00e-01	6.5e-04	3.64e+02	5.3e+00	8.4e-01		
1,1,2,2-Tetrachloroethane		0.0e+00	1.18e+02				
Toluene	2.30e+00	8.9e-03	3.00e+02	1.8e+01			
Chlorobenzene	9.60e-02	3.4e-04	3.30e+02	2.0e+01			
Ethylbenzene	1.10e+00	1.2e-03	1.10e+03	3.2e+01			
Styrene		0.0e+00	1.89e+02				
Xylenes (mixed)	3.00e+00	1.1e-02	3.30e+02				
SEMIVOLATILES							
Phenol	2.40e-01	1.1e-03	1.42e+01	1.0e+01	2.6e+00		
bis(2-Chloroethyl) ether	2.50e-01	1.2e-03	1.39e+01	2.4e+02			
2-Chlorophenol		0.0e+00	1.55e+01				
1,3-Dichlorobenzene	3.00e-03	2.1e-06	1.70e+03				
1,4-Dichlorobenzene	1.00e-02	7.1e-06	1.70e+03	1.1e+00	7.6e-01		
Benzyl Alcohol		0.0e+00	1.28e+01				
1,2-Dichlorobenzene	3.30e-02	2.3e-05	1.70e+03	1.1e+00	7.6e-01		
2-Methylphenol	3.80e-02	9.0e-05	5.00e+02				

TABLE 7-48
COMPARISON OF AMBIENT WATER QUALITY CRITERIA TO PREDICTED SURFACE WATER CONCENTRATIONS
ACS Site, Griffith, Indiana

Compound	Upper Aquifer (mg/L)	Predicted Surface Water (mg/L)	Koc (ml/g)	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic
bis(2-Chloroisopropyl)ether	3.00e-01	5.0e-04	6.10e+01				
4-Methylphenol	2.20e+00	5.2e-03	5.00e+02				
N-Nitroso-di-n-dipropylamine		0.0e+00					
Hexachloroethane		0.0e+00					
Nitrobenzene		0.0e+00					
Isopherone	3.50e-02	1.1e-04	2.49e+01	1.2e+02			
2-Nitrophenol		0.0e+00					
2,4-Dimethylphenol	1.10e-01	2.5e-04	4.20e+01	2.1e+00			
bis(2-Chloroethoxy)methane		0.0e+00					
2,4-Dichlorophenol		0.0e+00	3.80e+02				
1,2,4-Trichlorobenzene		0.0e+00	9.20e+03				
Naphthalene	7.10e-02	1.3e-04	6.49e+02	2.3e+00	6.2e-01		
4-Chloroaniline		0.0e+00					
Hexachlorobutadiene		0.0e+00	2.90e+04				
4-Chloro-3-methylphenol	5.00e-03	1.0e-05	4.70e+01	3.0e-02			
2-Methylnaphthalene	2.70e-02	4.5e-05	7.12e+02	1.7e+00	5.2e-01		
Hexachlorocyclopentadiene		0.0e+00					
2,4,6-Trichlorophenol		0.0e+00	2.00e+03				
2,4,5-Trichlorophenol		0.0e+00	8.90e+01				
2-Chloronaphthalene		0.0e+00	7.12e+02				
2-Nitroaniline		0.0e+00					
Dimethylphthalate		0.0e+00	4.03e+01				
Acenaphthylene		0.0e+00	2.50e+03				
3-Nitroaniline		0.0e+00					
Acenaphthene		0.0e+00	4.60e+03				
2,4-Dinitrophenol		0.0e+00					
4-Nitrophenol		0.0e+00	2.12e+01				
Dibenzofuran		0.0e+00	8.20e+02				
2,4-Dinitrotoluene		0.0e+00	4.50e+01				
Diethylphthalate	9.00e-03	7.1e-05	1.42e+02				
4-Chlorophenyl-phenylether		0.0e+00					
Fluorene		0.0e+00	7.30e+03				
4-Nitroaniline		0.0e+00					
4,6-Dinitro-2-methylphenol		0.0e+00					
N-nitrosodiphenylamine		0.0e+00	4.70e+02	5.9e+00			
4-Bromophenyl-phenylether		0.0e+00	8.20e+02				
Hexachlorobenzene		0.0e+00	3.90e+03				
Pentachlorophenol	3.00e-03	6.9e-08	5.30e+04	5.5e-02	3.2e-03		
Phenanthrene		0.0e+00	1.48e+04				
Anthracene		0.0e+00	1.40e+04				
Di-n-butylphthalate	2.00e-03	1.4e-08	1.70e+05	9.4e-01			
Fluoranthene		0.0e+00	3.80e+04	4.0e+00			
Pyrene		0.0e+00	3.80e+04				
Butylbenzylphthalate		0.0e+00	2.43e+03	3.3e+00	2.2e-01		
3,3'-Dichlorobenzidine		0.0e+00					
Benzo(a)anthracene(c)		0.0e+00	1.38e+06				
Chrysene(c)		0.0e+00	2.00e+05				

TABLE ...
COMPARISON OF AMBIENT WATER QUALITY CRITERIA TO ...
ACS S..., Griffith, Indiana

Compound	Upper Aquifer (mg/L)	Predicted Surface Water (mg/L)	Koc (ml/g)	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic
bis(2-ethylhexyl)phthalate	5.00e-02	8.6e-05	6.92e+02	4.0e-01	3.6e-01		
Di-n-octyl Phthalate		0.0e+00	6.92e+02				
Benzo(b)fluoranthene(c)		0.0e+00	5.50e+05				
Benzo(k)fluoranthene(c)		0.0e+00	5.50e+05				
Benzo(a)pyrene(c)		0.0e+00	5.50e+06				
Idono(1,2,3-cd)pyrene(c)		0.0e+00	1.60e+06				
Dibenz(a,h)anthracene(c)		0.0e+00	3.30e+06				
Benzo(g,h,i)perylene		0.0e+00	1.60e+06				
Total-Carcinogenic PAHs		0.0e+00					
PESTICIDE/PCB							
alpha-BHC		0.0e+00	3.80e+03				
beta-BHC		0.0e+00	3.80e+03				
delta-BHC		0.0e+00					
gamma-BHC (Lindane)		0.0e+00	1.08e+03				
Heptachlor		0.0e+00					
Aldrin		0.0e+00	9.60e+04	3.0e-03			
Heptachlor epoxide		0.0e+00	2.20e+02	5.2e-04	3.8e-06		
Endosulfan I		0.0e+00	2.43e+06	2.2e-04	5.6e-05		
Dieldrin		0.0e+00					
4,4'-DDE		0.0e+00	4.40e+06				
Endrin		0.0e+00					
Endosulfan II		0.0e+00					
4,4'-DDD		0.0e+00	7.70e+05				
Endosulfan sulfate		0.0e+00					
4,4'-DDT		0.0e+00	2.43e+05				
Methoxychlor		0.0e+00					
Endrin ketone		0.0e+00	1.70e+03				
alpha-Chlordane		0.0e+00					
gamma-Chlordane		0.0e+00					
Toxaphene		0.0e+00					
Total - PCBs	2.96e-02	6.8e-08	5.30e+05	2.0e-03	1.4e-05		
METALS							
Aluminum	2.80e-01	5.4e-04					
Antimony		0.0e+00		9.0e+00	1.6e+00		
Arsenic	4.32e-02	8.6e-05		3.6e-01	1.9e-01		
Barium	1.84e+00	3.7e-03					
Beryllium	2.50e-04	5.0e-07		1.3e-01	5.3e-03		
Cadmium (water)	3.10e-03	6.2e-06		3.9e-03	1.1e-03		
Cadmium (food/soil)		0.0e+00					
Chromium III		0.0e+00					
Chromium VI	3.90e-03	7.8e-06		1.6e-02	1.1e-02		
Cobalt		0.0e+00					
Copper		0.0e+00		1.8e-02	1.2e-02		

TABLE 7-48
COMPARISON OF AMBIENT WATER QUALITY CRITERIA TO PREDICTED SURFACE WATER CONCENTRATIONS
ACS Site, Griffith, Indiana

Compound	Upper Aquifer (mg/L)	Predicted Surface Water (mg/L)	Koc (ml/g)	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic
Lead	4.60e-03	9.2e-06		8.2e-02	3.2e-03		
Manganese	4.25e+00	8.5e-03					
Mercury	1.70e-03	3.4e-06		2.4e-03	1.2e-05		
Nickel	5.30e-02	1.1e-04		1.8e+00	9.6e-02		
Potassium	9.58e+01	1.9e-01					
Selenium	6.20e-03	1.2e-05		2.6e-01	3.5e-02		
Silver		0.0e+00					
Sodium	4.44e+02	8.9e-01					
Thallium	4.00e-03	8.0e-06		1.4e+00	4.0e-01		
Vanadium	2.59e-02	5.2e-05					
Zinc	8.86e-01	1.8e-03		3.2e-01	4.7e-02		
Cyanide	1.00e-02	2.0e-05		2.2e-02	5.2e-03		

Notes:

- Ambient Water Quality Criteria (AWQC) are presented for both acute and chronic durations of exposure to contaminants. If AWQC are not presented it is because the U.S. EPA has not yet developed criteria for the chemical. An AWQC is the concentration of a chemical which should protect sensitive forms of aquatic life.

- Surface water chemical concentrations were predicted for the wetlands where there is the potential for contaminanted groundwater to discharge. Surface water chemical concentrations were predicted by dividing the groundwater chemical concentration by the chemical's retardation factor, a 10-fold biodegradation factor, and a 10-fold surface water dilution factor. The retardation factor was used to estimate the degree of dilution that would occur as the chemical passes through the aquifer and wetlands sediment. The biodegradation factor was applied only to those chemicals with Koc values less than 100 to account for their biodegradation potential. A surface water dilution factor was used to account for the dilution of contaminanted groundwater with clean surface water.

- The following is the equation used to calculate retardation factors for chemicals of potential concern:

  Retardation factor (unitless) = 1 + (soil bulk density/soil porosity) * Koc * foc

  Where the soil bulk density (1.9 g/cubic centimeter), and porosity (0.3) were used to represent aquifer and sediment conditions (refer to Section 6.2.1 and Table 6-2 of the RI report for more detailed, and specific estimates of these parameters). The chemical specific Koc is provided above. The average fraction of organic carbon (foc = 0.013) in sediment samples was used.

  Because inorganic analytes do not have Koc values, a retardation factor could not be calculated. Rather, a default soil-water distribution coefficient (i.e., 50) was used to account for metal retardation.

Legend:

E= Surface water concentration of contaminant exceeds the AWQC for the contaminant

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TABLE 7-49
SEDIMENT QUALITY CRITERIA AND HAZARD QUOTIENTS
ACS Site, Griffith, Indiana

Compound	Sediment (mg/kg)	Surface Water (mg/L)	Koc-organics and Kd-Inorganics	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic	Acute SQC mg/kg	Chronic SQC mg/kg	Acute HQ	Chronic HQ	SQC Exceedance Acute	SQC Exceedance Chronic
Chloroethane			3.50e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Bromomethane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Vinyl chloride			5.70e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Chloroethane	1.16e-02	3.00e-02	2.20e+00					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Methylene chloride	2.58e-02		8.80e+00	1.9e+02				2.2e+01	0.0e+00	1.2e-03	0.0e+00		
Acetone		3.80e-01	2.20e+00					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Carbon disulfide			5.40e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,1-Dichloroethene			6.50e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,1-Dichloroethane		2.00e-03	3.00e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,2-Dichloroethene (cis)	5.60e-03	3.00e-03	4.90e+01	1.4e+02				8.6e+01	0.0e+00	6.5e-05	0.0e+00		
1,2-Dichloroethene (trans)								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Chloroform	5.93e-03		3.10e+01	2.9e+01	1.2e+00			1.2e+01	5.0e-01	5.1e-04	1.2e-02		
1,2-Dichloroethane			1.40e+01	1.2e+02	2.0e+01			2.1e+01	3.6e+00	0.0e+00	0.0e+00		
2-Butanone	8.86e-03	1.40e-01	4.50e+00					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,1,1-Trichloroethane	3.00e-03		1.52e+02	5.3e+01				1.0e+02	0.0e+00	2.9e-05	0.0e+00		
Carbon tetrachloride			1.10e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Vinyl acetate								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Bromodichloromethane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,2-Dichloropropane			5.10e+01	2.3e+01	5.7e+00			1.5e+01	3.8e+00	0.0e+00	0.0e+00		
cis-1,3-Dichloropropene								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Trichloroethene			1.26e+02	4.5e+01	2.2e+01			7.4e+01	3.6e+01	0.0e+00	0.0e+00		
Dibromochloromethane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,1,2-Trichloroethane			5.60e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Benzene	4.30e-01	4.60e-01	8.30e+01	5.3e+00				5.7e+00	0.0e+00	7.5e-02	0.0e+00		
trans-1,3-Dichloropropene								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Bromoform								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4-Methyl-2-pentanone		4.90e-02	2.05e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2-Hexanone			3.90e+00					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Tetrachloroethene			3.64e+02	5.3e+00	8.4e-01			2.5e+01	4.0e+00	0.0e+00	0.0e+00		
1,1,2,2-Tetrachloroethane			1.18e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Toluene	4.89e-02	8.00e-03	3.00e+02	1.8e+01				6.8e+01	0.0e+00	7.2e-04	0.0e+00		
Chlorobenzene			3.30e+02	2.0e+01				8.4e+01	0.0e+00	0.0e+00	0.0e+00		
Ethylbenzene	1.31e-02	5.40e-03	1.10e+03	3.2e+01				4.6e+02	0.0e+00	2.9e-05	0.0e+00		
Styrene			1.89e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Xylenes (mixed)	1.60e-02	3.50e-02	3.30e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
SEMIVOLATILES													
Phenol	1.90e-01	4.50e-02	1.42e+01	1.0e+01	2.6e+00			1.9e+00	4.7e-01	1.0e-01	4.0e-01		
bis(2-Chloroethyl) ether	3.61e-01	7.70e-02	1.39e+01	2.4e+02				4.3e+01	0.0e+00	8.4e-03	0.0e+00		
2-Chlorophenol			1.55e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,3-Dichlorobenzene			1.70e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,4-Dichlorobenzene			1.70e+03	1.1e+00	7.6e-01			2.5e+01	1.7e+01	0.0e+00	0.0e+00		

TABLE 7-49
SEDIMENT QUALITY CRITERIA AND HAZARD QUOTIENTS
ACS Site, Griffith, Indiana

Compound	Sediment (mg/kg)	Surface Water (mg/L)	Koc·organics and Kd-Inorganics	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic	Acute SQC mg/kg	Chronic SQC mg/kg	Acute HQ	Chronic HQ	SQC Exceedance Acute	SQC Exceedance Chronic
Benzyl Alcohol			1.28e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,2-Dichlorobenzene			1.70e+03	1.1e+00	7.6e-01			2.5e+01	1.7e+01	0.0e+00	0.0e+00		
2-Methylphenol		5.00e-03	5.00e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
bis(2-Chloroisopropyl)ether	5.77e-01	2.90e-02	6.10e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4-Methylphenol	2.70e-01	5.90e-01	5.00e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
N-Nitroso-di-n-dipropylamine								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Hexachloroethane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Nitrobenzene								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Isophorone		5.00e-03	2.49e+01	1.2e+02				3.8e+01	0.0e+00	0.0e+00	0.0e+00		
2-Nitrophenol								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2,4-Dimethylphenol	3.62e-01	1.08e-02	4.20e+01	2.1e+00				1.2e+00	0.0e+00	3.1e-01	0.0e+00		
bis(2-Chloroethoxy)methane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2,4-Dichlorophenol			3.80e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,2,4-Trichlorobenzene			9.20e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Naphthalene	3.57e-01		6.49e+02	2.3e+00	6.2e-01			1.9e+01	5.2e+00	1.8e-02	6.8e-02		
4-Chloroaniline								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Hexachlorobutadiene			2.90e+04					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4-Chloro-3-methylphenol		2.00e-01	4.70e+01	3.0e-02				1.8e-02	0.0e+00	0.0e+00	0.0e+00		
2-Methylnaphthalene	3.41e-01		7.12e+02	1.7e+00	5.2e-01			1.6e+01	4.8e+00	2.2e-02	7.1e-02		
Hexachlorocyclopentadiene								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2,4,6-Trichlorophenol			2.00e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2,4,5-Trichlorophenol			8.90e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2-Chloronaphthalene			7.12e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2-Nitroaniline								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Dimethylphthalate			4.03e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Acenaphthylene			2.50e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
3-Nitroaniline								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Acenaphthene			4.60e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2,4-Dinitrophenol								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4-Nitrophenol			2.12e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Dibenzofuran	2.30e-01		8.20e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2,6-Dinitrotoluene			4.50e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Diethylphthalate			1.42e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4-Chlorophenyl-phenylether								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Fluorene	3.95e-01		7.30e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4-Nitroaniline								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4,6-Dinitro-2-methylphenol								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
N-nitrosodiphenylamine			4.70e+02	5.9e+00				3.6e+01	0.0e+00	0.0e+00	0.0e+00		
4-Bromophenyl-phenylether			8.20e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Hexachlorobenzene	1.40e-01		3.90e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Pentachlorophenol	2.30e-01		5.30e+04	2.0e-02	1.3e-02			1.4e+01	9.0e+00	1.7e-02	2.6e-02		
Phenanthrene	3.77e-01		1.40e+04					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Anthracene	1.00e-01		1.40e+04					0.0e+00	0.0e+00	0.0e+00	0.0e+00		

TABLE 7-49
SEDIMENT QUALITY CRITERIA AND HAZARD QUOTIENTS
ACS Site, Griffith, Indiana

Compound	Sediment (mg/kg)	Surface Water (mg/L)	Koc-organics and Kd-Inorganics	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic	Acute SOC mg/kg	Chronic SOC mg/kg	Acute HQ	Chronic HQ	SQC Exceedance Acute	SQC Exceedance Chronic
Di-n-butylphthalate	1.70e-01		1.70e+05	9.4e-01				2.1e+03	0.0e+00	8.2e-05	0.0e+00		
Fluoranthene	5.24e-01		3.80e+04	4.0e+00				2.0e+03	0.0e+00	2.7e-04	0.0e+00		
Pyrene	5.00e-01		3.80e+04					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Butylbenzylphthalate	1.70e-01		2.43e+03	3.3e+00	2.2e-01			1.0e+02	6.9e+00	1.6e-03	2.4e-02		
3,3'-Dichlorobenzidine								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Benzo(a)anthracene(c)	4.57e-01		1.38e+06					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Chrysene(c)	4.29e-01		2.00e+05					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
bis(2-ethylhexyl)phthalate	5.07e+00		6.92e+02	4.0e-01	3.6e-01			3.6e+00	3.2e+00	1.4e+00	1.6e+00	E	E
Di-n-octyl Phthalate			6.92e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Benzo(b)fluoranthene(c)	6.24e-01		5.50e+05					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Benzo(k)fluoranthene(c)	6.36e-01		5.50e+05					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Benzo(a)pyrene(c)	4.18e-01		5.50e+06					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Indeno(1,2,3-cd)pyrene(c)	3.24e-01		1.60e+06					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Dibenz(a,h)anthracene(c)	2.00e-01		3.30e+06					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Benzo(g,h,i)perylene	3.59e-01		1.60e+06					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Total-Carcinogenic PAHs	3.09e+00							0.0e+00	0.0e+00	0.0e+00	0.0e+00		
PESTICIDE/PCB													
alpha-BHC			3.80e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
beta-BHC			3.80e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
delta-BHC								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
gamma-BHC (Lindane)			1.08e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Heptachlor								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Aldrin			9.40e+04	3.0e-03				3.7e+00	0.0e+00	0.0e+00	0.0e+00		
Heptachlor epoxide	2.66e-02		2.20e+02	5.2e-04	3.8e-06			1.5e-03	1.1e-05	1.8e+01	2.4e+03	E	E
Endosulfan I			2.43e+06	2.2e-04	5.6e-05			6.9e+00	1.8e+00	0.0e+00	0.0e+00		
Dieldrin								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4,4'-DDE			4.40e+06					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Endrin								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Endosulfan II								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4,4'-DDD			7.70e+05					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Endosulfan sulfate								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4,4'-DDT			2.43e+05					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Methoxychlor								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Endrin ketone			1.70e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
alpha-Chlordane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
gamma-Chlordane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Toxaphene								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Total - PCBs	4.11e+00	8.40e-04	5.30e+05	2.0e-03	1.4e-05		E	1.4e+01	9.6e-02	5.0e-01	4.3e+01		E
METALS													

TABLE 7-49
SEDIMENT QUALITY CRITERIA AND HAZARD QUOTIENTS
ACS Site, Griffith, Indiana

Compound	Sediment (mg/kg)	Surface Water (mg/L)	Koc-organics and Kd-inorganics	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic	Acute SQC mg/kg	Chronic SQC mg/kg	Acute HQ	Chronic HQ	SQC Exceedance Acute	SQC Exceedance Chronic
Aluminum		9.60e-01											
Antimony				9.0e+00	1.6e+00			0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Arsenic		4.50e-02	2.5e+02	3.6e-01	1.9e-01			8.9e+01	4.7e+01	0.0e+00	0.0e+00		
Barium	7.12e-02	3.22e-01						0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Beryllium		2.69e-04		1.3e-01	5.3e-03			0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Cadmium (water)		7.20e-04	4.1e+02	3.9e-03	1.1e-03			1.6e+00	4.5e-01	0.0e+00	0.0e+00		
Cadmium (food/soil)								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Chromium III								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Chromium VI	4.54e-02	2.80e-02		1.6e-02	1.1e-02	E	E	0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Cobalt								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Copper	9.44e-02	1.90e-02	5.1e+03	1.8e-02	1.2e-02	E	E	9.2e+01	6.2e+01	1.0e-03	1.5e-03		
Iron		1.43e+01			1.0e+00		E	0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Lead		2.38e-02	2.3e+03	8.2e-02	3.2e-03		E	1.9e+02	7.3e+00	0.0e+00	0.0e+00		
Manganese		1.85e+00						0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Mercury	1.22e-03		8.7e+01	2.4e-03	1.2e-05			2.1e-01	1.0e-03	5.9e-03	1.2e+00		E
Nickel	2.06e-02	8.00e-02		1.4e+00	1.4e-01			0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Potassium		3.00e+01						0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Selenium	5.73e-04	1.83e-03		2.6e-01	3.5e-02			0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Silver								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Sodium		8.23e+01						0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Thallium				1.4e+00	4.0e-01			0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Vanadium	3.45e-02							0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Zinc		8.80e-02	2.5e+03	3.2e-01	4.7e-02		E	7.9e+02	1.2e+02	0.0e+00	0.0e+00		
Cyanide				2.2e-02	5.2e-03			0.0e+00	0.0e+00	0.0e+00	0.0e+00		

Notes:

- The Sediment Quality Criteria (SQC) for organic compounds are calculated by multiplying the Ambient Water Quality Criteria (AWQC) by the compound's soil-water partition coefficients (Koc) and the percent total organic carbon (% TOC) in sediment (i.e., 0.013 or 1.3%).
- AWQC and SQC are presented for both acute and chronic durations of exposure to contaminants. If AWQC are not presented it is because the U.S. EPA has not yet developed criteria for the chemical. An AWQC is the concentration of a chemical which should protect sensitive forms of aquatic life.
- Hazard Quotients (HQ) are developed for both acute and chronic durations of exposure to surface water or sediment. A HQ of greater than 1 indicates the sediment concentration may pose a health threat to aquatic life.
- SQC for six metals are developed by multiplying AWQC by metal distribution coefficients obtained from the literature (Chapman, 1989). The % TOC of 1.3 % is substituted in Chapman's calculations for development of Kd values for the ACS Site. The following are Chapman's linear regression equations for specific metals.

TABLE 7-49
SEDIMENT QUALITY CRITERIA AND HAZARD QUOTIENTS
ACS Site, Griffith, Indiana

Arsenic: log Kd = -0.05 (%TOC) + 2.46
Cadmium: log Kd = 0.21 (%TOC) + 2.34
Copper: log Kd = 0.33 (%TOC) + 3.28
Lead: log Kd = 0.20 (%TOC) + 3.10
Mercury: log Kd = 0.05 (%TOC) + 1.87
Zinc: log Kd = 0.074 (%TOC) + 3.29

Legend:

E= Surface water or sediment concentration of contaminant exceeds the AWQC for the contaminant
HQ= Hazard Quotient

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MUK/mwk/JFK
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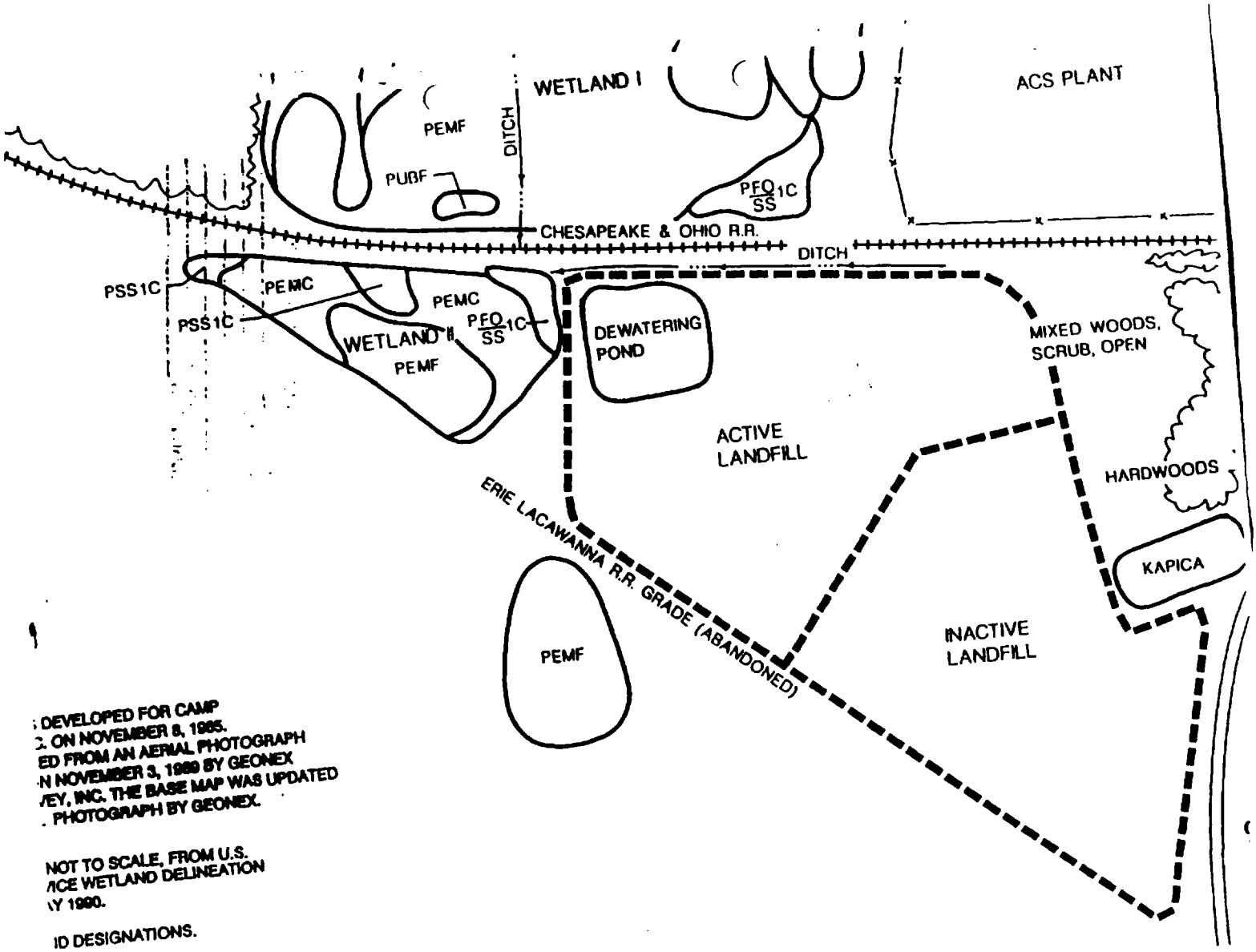

; DEVELOPED FOR CAMP
2. ON NOVEMBER 8, 1985.
ED FROM AN AERIAL PHOTOGRAPH
N NOVEMBER 3, 1989 BY GEONEX
/EY, INC. THE BASE MAP WAS UPDATED
. PHOTOGRAPH BY GEONEX.

NOT TO SCALE, FROM U.S.
/ICE WETLAND DELINEATION
\Y 1990.

ID DESIGNATIONS.

TABLE 7-46

Health Based Risk Estimates For Fish
ACS Site, Griffith, Indiana

Sediment

Chemical	Concentration (mg/kg) (from table 7-39)	Body Burden (1) (mg/kg/day)	Reference Dose (2) (mg/kg/day)	Hazard Quoti (unitless)
DEHP	5.1e+00	2.0e-02	5.8e+01	3.5e-05
Mercury	1.2e-03	9.6e-07	1.0e+01	9.4e-08
Total Risk				4.0e-05

Surface Water(3)

Chemical	Concentration (mg/L)	Exposure Point(1) Concentration (mg/L)	Reference Dose (mg/L)	Hazard Quoti (unitless)
2-Butanone	2.2e+00	2.2e-00	1.1e+02	2.0e-02
4-Methylphenol	5.9e-01	5.9e-01	4.0e+00	1.5e-01
Manganese	1.8e+00	1.8e-00	4.0e+02	4.5e-03
Total Risk				2.0e-01

Notes:

- The health risk estimates are calculated to represent the approximate risk to fish (e.g., bluegills and minnows). The risk estimates are calculated based on aquatic toxicity information and daily food and water consumption rates for bluegills.
- A hazard quotient greater than 1 indicates that exposure to the contaminant may cause deleterious health effects.

Footnotes:

1. To estimate the body burden of the chemical due to sediment ingestion, the chemical intake/day is multiplied by a bioaccumulation factor (i.e., 0.5 for organics, and 0.1 for inorganics; see Table 7-44 for an explanation). To estimate the exposure point concentration of fish to surface water, the actual or predicted (see footnote 3) surface water chemical concentration is used.
2. Reference doses (i.e., safe chemical body burdens) are estimated to assess the toxicity of ingested sediment. The safe water concentration of a chemical is multiplied by the chemical's BCF to calculate a safe body burden. The following are the safe water concentrations and BCF values used for the sediment contaminants of potential concern:

TABLE 7-46
(Continued)

Contaminant	Safe Water Concentration (mg/L)	BCF L/kg
DEHP	0.115	500
Mercury	0.001	10,000

To assess the toxicity of exposure from chemical uptake from water, a safe level of the chemical determined from bioassays with water alone is used to estimate the reference dose for surface water.

3. Surface water chemical concentrations are used to calculate health risks to this medium unless the upper aquifer chemical concentration exceeds the surface water chemical concentration by more than 100-fold. When this occurs (i.e., 2-butanone), the groundwater chemical concentration is divided by 100 and used to represent the surface water chemical concentration as a result of groundwater discharge to the wetland. The 100-fold factor represents a 10-fold biodegradation factor and 10-fold dilution factor.

Legend:

DEHP= Bis(2-ethylhexyl)phthalate

MWK/ccf/JFK
[mad-401-89e]
60251.17

WARZYN

Report
Text, Tables, Figure
60251

Remedial Investigation Report
Baseline Risk Assessment
ACS NPL Site
Griffith, Indiana

Prepared for:
Steering Committee
ACS PRP Group

Prepared by:
Warzyn Inc.
Madison, Wisconsin

EXHIBIT
H

October 1991

WARZYN September 7, 1991

Mr. Wayde M. Hartwick, RPM
Mail Code 5HS-11
U.S. EPA Region V
230 South Dearborn
Chicago, Illinois 60604

RE: Letter of Transmittal
Ecological Assessment
American Chemical Services NPL Site
Project # 60251

Dear Mr. Hartwick:

Warzyn Inc. has revised the Ecological Assessment for the ACS NPL Site. The changes which have been made to the Risk Assessment were based on the BTAG memo dated August 9, 1991, which was attached to the letter you sent to Warzyn on August 19, 1991. The BTAG letter contained 25 numbered comments.

As you requested, we are sending copies of the Ecological Assessment to you, Jim Burton at Roy F. Weston, and David Charters, as follows:

Wayde Hartwick	5	clean copies	1	red-line copy
David Charters	1	clean copy		
Jim Burton	1	clean copy	1	red-line copy

We have responded to those comments as completely as possible, and included a red-line copy to you and Weston to facilitate your review. In addition, a table is attached to provide the details of our response to each of the 25 comments.

The re-drafted report is being submitted to you for delivery on October 8, 1991, as agreed in telephone conversations last week. Please call if I can be of further assistance or facilitate your review in any way.

Sincerely yours,

WARZYN INC.

Peter J. Vagt

Peter J. Vagt, Ph.D.
Project Coordinator

Enclosure

cc: PRP Technical Subcommittee
J. Burton, 2 copies
D. Charters, 1 copy

PV/klr/DWH
[mad-110-42]
60251.23

THE PERFECT BALANCE BETWEEN TECHNOLOGY AND CREATIVITY.

MADISON
ONE SCIENCE COURT
P.O. BOX 5365
MADISON, WI 53705
(608) 231-4444
FAX (608) 273-2513

Response to U.S. EPA Comments Dated August 9, 1991 on the Draft Ecological Assessment

1. The approach Warzyn used is appropriate based on current guidance for Human Health Risk Evaluations, and in lieu of the lack of published guidance for ecological assessments.

2. The approach is considered appropriate; further clarifications of the applicability of the approach has been provided.

3. Approach is considered appropriate based on guidance from U.S. EPA (i.e., David Charters, at April 1991 meeting) in regard to updating the draft ecological assessment. Additional chemicals have not been added to the evaluation.

   The approach used to screen for the toxic potential of a chemical has been explained in further detail. The uncertainty associated with using species-specific reference doses has been noted.

4. Approach is valid and clarification has been provided to justify its use.

5. Soil binding constants for metals could not be located for each chemical in the literature. Such values do exist, but are not defined as Koc's. BCFs and BAFs can not be applied for screening purposes, because of wide species to species and test procedure variability among studies. Therefore, changes were not made to the the report.

6. See response to Comment #3.

7. Revision has been provided for the information which was obtained from the Aquatic Information Retrieval (AQUIRE) database.

8. Further clarification has been to explain why PCBs are handled separately.

9. A reference has been added, and the footnote concept has been brought into the text as requested.

10. Warzyn's approach is valid. A clarification of the approach and further justification has been added.

11. Revisions have been provided based on the data which was obtained through the AQUIRE database. Revisions were not made for chemicals without for which data was not available from AQUIRE.

12. A qualitative discussion was included to point out which chemicals exceed AWQC. No further analysis will be performed beyond this (i.e., LOEL estimation from literature).

13. The original dilution factor was used to account for dilution with clean surface water and groundwater discharge, as well as, attenuation due to chemical binding to subsurface wetlands sediments. The factor has been be retained and its use clarified.

    The biodegradation factor was only used for nonpersistent chemicals (i.e., generally more water soluble).

14. Revision has been provided as requested for the chemicals for which appropriate information was obtained from the AQUIRE database.

15. Text has been updated to be consistent with RI Report.

16. Based on Warzyn's field investigation, the drainage ditch along the railroad corridor is ephemeral. Warzyn has been to the Site throughout the year.

17. Revision has been provided as requested.

18. Revision has been provided as requested.

19. The BAFs for organics and inorganics were default values based on professional judgment. Appropriate BAFs were not provide in the AQUIRE data base.

20. Revision has been provided as requested.

21. The potential for health effects to occur to mink populations been revised.

22. The text has been rewritten to address the fact that an AWQC exceedance means there is the potential for sensitive species to be affected.

23. Sediment Quality Criteria has been applied to continuously inundated sediments. Sediment Quality Criteria can be calculated for any chemical that may partition between sediment and water. This has been further explained in the text of the revised report.

24. The statement is considered accurate and is not necessarily in contradiction with the last sentence.

25. Revision has been provided as requested.

Remedial Investigation Report
Baseline Risk Assessment
ACS NPL Site
Griffith, Indiana

October 1991

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7.2 ECOLOGICAL ASSESSMENT

7.2.1 Objectives

The objectives of the Ecological Assessment are to characterize the natural habitats and populations that may be influenced by the Site and to evaluate the actual or potential adverse effects contaminants have on these habitats and populations. The approach of the ecological assessment includes identifying contaminants of potential concern, pathways of contamination migration, and populations (floral and faunal species) potentially affected by Site contamination. Effects of the contaminants of concern on the target populations are assessed in terms of ecological endpoints. The Ecological Assessment estimates the risks to species of concern for the current Site status.

In the absence of published guidance documents for calculating quantitative ecological risks, review comments and examples provided by U.S. EPA (Charters, personal communication, 1991) were used to develop this Ecological Assessment. Guidance for portions of the Ecological Assessment are provided by the U.S. EPA in the following references:

U.S. Environmental Protection Agency, 1989a. Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference. EPA/600/3-89/013.

U.S. Environmental Protection Agency, 1989b. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002. (RAGS, Vol. I).

U.S. Environmental Protection Agency, 1989c. Risk Assessment Guidance for Superfund, Volume II Environmental Evaluation Manual. EPA/540/1-89/001. (RAGS, Vol. II).

The Ecological Assessment addresses selected Site contaminants that likely represent the greatest hazard to biological populations, based on greatest toxicity or greatest detected concentration. Species are selected to be representative of populations in the Site environment. Although some of these may not be present at the Site currently, future conditions may allow these species to occur. The Ecological Assessment is an evaluation of risk to ecological population from the Site, based on the effects of selected Site contaminants to species representative of the Site area.

7.2.2 Ecological Assessment Scope

This Ecological Assessment addresses the ecological resources of the Site, as described in Section 1.3.1 of this RI report, and the surrounding areas. Surface water run-off and run-on for the Site area are limited by former construction activities. Construction of the Grand Trunk Railroad grade (northern side), the now abandoned Erie Lackawanna Railroad grade (southwestern side), and Colfax Avenue (eastern side) has isolated the Site and a small area west of it to form a watershed of approximately 130 acres. Surface water flow into the Site area occurs through one drainage ditch. Surface water runoff is captured within the watershed by internal drainage.

The major emphasis of the Ecological Assessment is on wetlands in the Site area; most other areas are or have been developed or disturbed to some extent. Terrestrial habitats are mostly limited to areas that have been used in the past as landfill or disposal sites.

A wetland assessment of the Site was performed by the U.S. Fish and Wildlife Service (F&WS). A copy of the F&WS report is included in Appendix N. Information from the F&WS report is supplemented in this Ecological Assessment by Warzyn's Site observations. This Ecological Assessment addresses baseline conditions for the Site in its current condition and use. Future Site use will be addressed by Feasibility Study remediation alternatives. Assessments of risks to ecological resources based on future Site use will vary with the Feasibility Study alternatives and are addressed in a discussion of those alternatives.

7.2.3 Study Area Description

As described in Section 7.2.2 above, the Ecological Assessment addresses the watershed formed by transportation corridors between which the Site is located. This area, of approximately 130 acres, includes primarily upland and wetland habitats.

7.2.3.1 Hydrological Summary

As described in Sections 4.4, 5.3, and 6.3 of this RI report, the Site watershed is limited in area. Surface inflow and outflow are minor in nature. Water sources are primarily from rainfall and snow melt within the watershed. Discharge from the watershed occurs primarily through evapotranspiration (i.e., evaporation from plant material).

Surface water drainage from the Grand Trunk Western Railroad tracks appears to be channelized into a drainage ditch and culvert discharging into the Site at location SD10 (see Figure 2-4). The drainage ditch parallels the Grand Trunk Western Railroad tracks on the southern side of the rail line for approximately 1,000 ft to the northwest, at which point the ditch turns to the south and bisects Wetland I (as designated in the F&WS report) from approximately north to south. This surface drainage system appears to end at the Chesapeake and Ohio Railroad grade, causing surface water to back-up into Wetland I and infiltrate or evaporate.

Site observations suggest the drainage from Wetland I through a culvert into Wetland II no longer occurs. Efforts to dewater the active portion of the City of Griffith Landfill appear to have altered surface water drainage in the area. Although surface water from a ditch on the southern side of the Chesapeake and Ohio Railroad tracks drains into Wetland II, drainage from the City landfill and the off-Site containment area are routed to a City of Griffith sanitary sewer. The isolated drainage areas are indicated in Figure 4-12. Small amounts of water from a new disposal cell are pumped into a ditch west of the landfill, which is connected to wetlands south of the Erie Lackawanna Railroad grade.

Shallow groundwater flow paths from the Site plant property include drainage to the northwest and west (paths 1 and 2 in Figure 4-21). These paths may result in discharge to Wetland I under some hydrologic conditions, causing the wetland to provide some groundwater discharge function.

7.2.3.2 Aquatic Areas

The railroad drainage ditches and the drainage west of the off-site containment area appear to be ephemeral drainage ditches. Based on the density of cattails around it, the drainage ditch through Wetland I appears to contain water much of the year, but due to its narrow width, provides limited aquatic habitat.

Permanent ponds on the Site include a fire pond and process lagoon on the Site plant property and a disposal cell at the landfill. Because of their industrial use, the Site plant ponds do not provide aquatic habitat. The disposal cell at the landfill has been recently excavated (February 1989) and has received limited colonization by aquatic species. Water is continually being pumped from this cell by the landfill operators in anticipation of its future use.

7.2.3.3 Site Wetlands

The F&WS report has delineated and described two wetland areas in the Site watershed, separated from each other by the Chesapeake and Ohio Railroad grade. The northern wetland, designated Wetland I, is approximately 29 acres in size. Wetland II, south of the Chesapeake and Ohio Railroad tracks, covers approximately 5 acres. Wetland areas are shown in Figure 7-3. Figure 4-21 indicates groundwater flow from the upland Site areas to Wetlands I and II; thus, these areas function as groundwater discharge areas for at least a portion of the year.

Wetland community types described by the F&WS include the following types:

- PEMF-Palustrine, emergent, semi-permanently flooded
- PEMC-Palustrine, emergent, seasonally flooded
- PFO1C-Palustrine, forested, broadleaf deciduous, seasonally flooded
- PSS1C-Palustrine, scrub-shrub, broadleaf deciduous, seasonally flooded
- PUBF- Palustrine, unconsolidated bottom, semi-permanently flooded

Classifications are based on standard definitions according to Cowardin, et al. (1979).

Most of the PEMF and much of the PEMC areas are dense cattail (Typha spp.) marshes. Adjoining marsh areas are typically less frequently inundated than the cattail marshes and are dominated by sedges (Carex sp.) and wetland ferns (sensitive fern - Onoclea sensibilis and marsh fern - Thelypteris thelypteroides). Most other wetland areas present are mixed scrub-shrub, forested areas of only occasional inundation. These areas are dominated by willow (Salix spp.), dogwood (Cornus spp.), and sometimes cottonwoods (Populus deltoides), and slippery elms (Ulmus rubra).

7.2.3.4 Upland Habitats

Mature oak (Quercus spp.) forests are located on the western and northeastern corners and on the eastern side of the Site (see Figure 7-3). The large size of some of the mature trees suggests that, historically, areas that were too dry for the development of wetlands were established with oak forests. The perimeters of these woods appear to be the result of human disturbance to the oak forests, as they include invader species such as cottonwoods, aspens (Populus tremula), and sumacs (Rhus typhina).

Other terrestrial areas within the Site watershed are developed. The Site plant property is fenced and devoid of vegetation, providing minimal habitat. The City landfill is either actively being operated and bare of vegetation, or contains scarce grass cover on the inactive portions. The inactive landfill and parts of the off-Site containment area provide some field (grassland) habitat. The Kapica Drum property consists of buildings and crushed gravel surface.

7.2.3.5 Habitats of Surrounding Areas

Habitats near the Site are similar to those on-Site, and prior to development of the area, were likely continuous with Site habitats. As described in the F&WS report, wetlands are located on the northern, northwestern, eastern, and southern sides of the Site. Roads and drainage ditches appear to restrict surface water connections between these wetlands and the Site wetlands. Figure 4-21 does not indicate a groundwater flow path from the Site to the off-Site wetlands. Although there are wetlands adjacent to Turkey Creek one mile south of the Site, there does not appear to be a surface connection between Site wetlands and the creek-side wetlands. Wetland types are similar to those on-Site, including both marshes and wooded habitats.

Several bodies of standing water, most of them excavated, are within one mile of the Site. These ponds are northeast of the Site, out of the shallow groundwater path from the Site, or adjacent to Turkey Creek, almost one mile south of the Site.

The area surrounding the Site is sparsely populated and includes some hardwood forest habitats. The oak forest to the east of the Site plant is intermixed with wetlands. Less-dense hardwood stands are west and southeast of the Site. Agricultural fields are also southeast of the Site.

7.2.4 Ecological Assessment Assumptions

The following is a summary of the assumptions used in the Ecological Assessment to select chemicals of ecological concern by medium and to quantitatively assess risk to biota in the media of concern.

7.2.4.1 Media of Potential Concern at the Site

- Surficial soil samples at Kapica-Pazmey, sediment samples, ditch surface water samples, and shallow aquifer groundwater samples were considered to be applicable for media of ecological concern at the Site. Shallow groundwater chemical data were used to predict the impact of discharge of contaminated groundwater to wetlands surface water.

- Chemical concentrations for media of concern were represented by the lesser of the upper bound 95% confidence limit of the geometric mean or the maximum concentration detected on-site. This approach is consistent with current guidance for conducting Human Health Risk Assessments (U.S. EPA 1989) and was considered applicable for this ecological evaluation. TCL organics detected in media were selected as chemicals of potential concern, as were inorganics at greater than natural background concentrations. Tentatively identified compounds were not considered quantitatively in the Ecological Assessment.

- Chronic reference doses (RfDs) based on animal data are generally used for assessing the human toxicity of noncarcinogenic chemicals. These chronic reference doses were used, with modifications, as a means of estimating chemical toxicity to small mammals. The chronic human reference doses were divided by their uncertainty factors to arrive at an estimate of the appropriate chronic reference doses for the species (e.g., rat) that the human reference dose was based upon. For chronic reference doses that were developed based on subchronic animal data, the 10-fold uncertainty factor applied to estimate the chronic reference dose was retained.

- The soil organic carbon-water partition coefficient (K_{OC}) was used as an estimate of the bioaccumulation potential and soil adsorption potential of the contaminants. Soil organic carbon-water partition coefficients were selected to represent both chemical characteristics because they were readily available for each chemical. The potential of a chemical to bioaccumulate or be bound by soil is directly related. Therefore, a chemical's K_{OC} provides a relative measure of the potential to bioaccumulate, as well as a direct measure of a chemical's ability to bind to soil.

7.2.4.2 Selection of Chemicals of Potential Ecological Concern

Two screening methods were used to assess the relative importance of the contaminants detected in media of potential concern. The first screening method determined the relative importance of the contaminants based on their toxicity. The second screening method determined the relative importance of the contaminants based on their potential to bioaccumulate, or bind to aquifer material and wetland sediments.

To assess a contaminants importance based on toxicity, the chemical's concentration was multiplied by the inverse of the species-specific toxicity value defined as a reference dose[1]. The reference dose represents a daily dose of a chemical which, if exceeded, may cause deleterious health effects in exposed individuals. The percentage of the total toxicity importance for each chemical within a given medium was calculated. For each medium, the organic and inorganic analyte with the greatest toxicity importance value was selected as a chemical of potential concern for quantitative risk assessment. Utilizing this approach, the chemicals of greatest concern within each medium are utilized to calculate health risks. Where risks for chemicals were not quantitatively addressed, a qualitative judgment was made where applicable. This was accomplished by comparing the percent importance and resultant risk of the chemicals which were quantitatively addressed to the percent importance of the chemicals which were qualitatively considered.

To assess a contaminants importance based on fate and transport considerations, the K_{oc} for each chemical was used as a relative measure of the chemicals propensity to bioaccumulate or bind to soil. To calculate the importance of the contaminant based on its bioaccumulation potential, the chemical concentration was multiplied by the K_{oc} for surface water, sediment, and surface soils. In the case of groundwater, the potential for the chemical to migrate through the aquifer and subsurface wetlands sediments and then

1 A species-specific reference dose was utilized to estimate the toxicity of a chemical. Whenever possible, a rodent species toxicity value was selected to rule out potentially large differences between specific classes of animals (e.g., mammals vs. bony fishes) and orders of animals (e.g., rodents vs. carnivores) to the toxic effect of a given chemical. For the screening process, consistency in applying toxicity information was of great importance so that the screening results would not be skewed. Because it was beyond the scope of this assessment to screen the toxic potential of each chemical for a number of classes or orders of animals, the assumption was made that the relative toxic potential of a chemical would be consistent among classes and orders of animals. The order rodentia (rodents) was chosen for screening purposes, because this order of animals would be expected to be widely present at the Site, and there is a large amount of toxicity data available for this order. Where rodent data was not available, data from other types of animals anticipated to be at the Site were substituted (e.g., carnivora) in lieu of rodent data.

be released to surface water was considered of primary concern. To assess the likelihood that a chemical would be released to surface water, the groundwater chemical concentration was multiplied by the inverse of the K_{oc}. Similar to the toxicity screening method, the percentage of the total fate and transport importance for each chemical within a given medium was calculated. For each medium, the organic analyte with the greatest fate and transport importance was selected as a chemical of potential concern for the quantitative risk assessment. Because values similar to K_{oc}'s (i.e., K_d) could not be found in the available literature for most inorganic contaminants screening of inorganics based on fate and transport was not conducted.

Chemicals of Potential Concern-Toxicity

The following contaminants were the most important, based on toxicity and concentration. their respective reference doses are provided in parentheses in units of mg/kg/day:

Surface soil- toluene (20) and cadmium (0.04)

Sediment- bis(2-ethylhexyl)phthalate (2) and mercury (0.03)

Surface water- 2-butanone (5), 4-methylphenol(5), and manganese(10)

Terrestrial Risk Estimates

Risks were assessed to burrowing rodents using the following assumptions:

- Rat toxicity information was used
- Rat food intake and water ingestion rates were used
- It was assumed that the main pathways of exposure were through oral ingestion of soil, plant material, and surface water. It was assumed the animal's diet consisted of 5% soil by weight and 95% vegetation (i.e., 50% leafy material, 50% tubers/root material) from the contaminated areas. On-Site surface water was considered as the sole drinking water source.

Theoretical Burrowing Mammal Characteristics (based on the lab rat)

- Body weight= 0.250 kg
- Water consumption rate = 25 ml/day
- Food consumption rate= 15 grams/day

- Soil or sediment consumption rate= 0.75 g/day
- Vegetable consumption rates
  Leafy material = 7.125g/day
  Tubers/roots = 7.125g/day
- Assume home range of animal is small and completely within the contaminated area.

Organic Chemicals of Potential Concern- Bioaccumulation Potential

The primary organic contaminant of concern based on bioaccumulation potential was determined to be PCBs for surface soil, sediment, and surface water. Because of the different methodology employed to assess health risks to chemicals that bioaccumulate and potentially biomagnify through the foodchain (e.g., PCBs) it was considered necessary to separate this risk analysis from the earlier analysis based on toxicity potential.

To assess risks based on the bioaccumulation potential of PCBs, the mink was selected as the species of potential concern based on its high level in the food chain and its sensitivity to PCBs. It was assumed the mink ate primarily small game, and that based on the concentration of PCBs in surface water, the ingestion of surface water would not pose an appreciable pathway of exposure to mink in comparison to food sources.

- It was assumed the home range of the mink was 20 acres.
- A permissible mink diet PCB concentration of 0.64 mg/kg was used as the reference diet concentration that would be considered safe.
- It was assumed mink ate 90% small game and 10% wetland amphibians. This diet was based on information provided in Mammals of the Great Lakes Region by William H. Burt, and professional judgment. In developing this diet, based on Site conditions it was determined that fish were not likely available for mink to ingest. The ditch was not expected to support fish , because of its shallow depth and likely anoxic conditions during hot summer months and after winter ice over. The U.S. Environmental Protection Agency and Fish and Wildlife Service requested that an alternate diet composition be considered in the baseline risk assessment for mink. In the agency's opinion there may be the potential for fish and crayfish to exist in the ditch. The alternate diet consumption assumes a mink consumes 40% small game, 25% fish, 25% crayfish, and 10% wetland amphibians.
- It was assumed the mink ingested 1/20 of their diet of small game from Kapica-Pazmey and 19/20 of their small game from the wetlands, based on the size of these areas.

- It was assumed the frequency of detection of PCBs in the wetlands sediment (6/18) Kapica-Pazmey soil (12/16), and ditch sediment (2/6) directly affect the resultant contaminant concentration of prey which mink ingest. This is because as the frequency of detection of a contaminant becomes lower within an area, the probability that a prey species will encounter contamination decreases.

- Bioaccumulation factors (BAF) of 0.07 (small game), 0.22 (amphibians), 7 (fish), and 5 (crayfish) were used to assess the bioaccumulation of PCBs in the respective animal groups due to sediment ingestion.

- The predicted food concentration in each animal group for a specific area was calculated by multiplying the concentration of PCBs in the area (e.g., Kapica-Pazmey or wetlands), by the BAF, the proportion of the home range the area encompassed, and frequency of PCB detection in the area. The biota concentrations for each feeding area were added to get the home range concentration of PCBs in the diet for the specific animal group.

7.2.4.3 Aquatic Toxicity Estimates

The following contaminants were the most important based on toxicity and concentration: their respective reference doses are provided in parentheses in units of mg/kg for sediments and mg/L for surface water.

Sediment- bis(2-ethylhexyl)phthalate (57.5) and mercury (10.2)

Surface water- 2-butanone (1690), 4-methylphenol(4), and manganese(400)

- The sediment reference doses are based on a safe body burden of the chemical in mg/kg. This was estimated by multiplying the contaminant BCF in fish by the contaminant safe concentration in water.

- Reference doses for surface water represent safe concentrations of contaminants based on a bioassay conducted with water alone (i.e., no prey or sediment ingestion).

Risk were assessed to fish using the following assumptions:

- Fish toxicity information was used unless it was unavailable to derive reference doses. If fish data were not available, data on the most sensitive aquatic species that could be located in the available literature were utilized.

- Assumptions of a bluegill's sediment intake (i.e., 1000 mg/day) were used to assess risks due to sediment ingestion. Actual surface water chemical concentrations were used to assess the risk posed by the absorption of chemicals from surface water. If the shallow groundwater aquifer concentration divided by the chemicals retardation factor, dilution factor (10) and biodegradation factor (10) was greater than the actual surface water concentration of the chemical measured, it was used instead to represent the surface water concentration of the chemical in the wetland. The retardation factor was used to assess the chemicals potential to be attenuated by aquifer material and wetlands sediment. The dilution factor was used to assess the amount of dilution by clean groundwater discharging to surface water. The biodegradation factor was used to account for a chemical's potential to be biodegraded. The biodegradation factor was applied only to those chemicals which had a K_{oc} of 100 or below, which is based on professional judgment.

- It was assumed that the main route of contaminant exposure was through oral ingestion of sediment and dermal absorption from surface water. It was assumed that ingestion of contaminants through food (i.e., plant material and prey flesh) was minor compared to the concentration ingested in soil or sediment ingested directly, or indirectly through the ingestion of prey species (i.e., within the gastrointestinal track of the prey species).

- Fish body burdens, as a result of sediment ingestion, were calculated by dividing the product of the sediment concentration (mg/kg), the daily consumption rate of sediment (0.01 kg), and bioaccumulation factor (BAF; unitless) for the contaminant by the fish's weight ((0.125 kg). It was assumed the fish ate this amount of sediment on a continuous basis (i.e., steady-state conditions were reached).

Theoretical Fish Characteristics (based on the bluegill)

- Body weight= 0.125 kg
- Food consumption rate= 10 grams/day
- Sediment consumption rate= 1000 mg/day
- Assume home range is small and completely within the contaminated area.

7.2.5 Contaminants of Concern

Contaminants of ecological concern are those detected in environmental media of the habitats on-Site. These habitats, the appropriate environmental media sampled, and the size of the sample population (n), include the following:

- Wetlands - Surface water (n=0; refer to discussion below), sediments (n=3)
- Drainage ditches - Surface water (n=5), sediments (n=6)
- Terrestrial habitats - Off-Site containment area soils (n=16)

Values for the eleven shallow aquifer monitoring wells (n=24) are used to represent concentrations in the wetland surface waters because wetland waters were not sampled. Because the wetlands function as discharge areas for groundwater, shallow groundwater is likely to reach the wetlands.

Chemicals of concern for terrestrial habitats are considered to be those chemicals found in shallow soils (≤ 4 ft) from the off-Site containment area soil borings. Chemicals found in deeper soils are not readily available to biological communities. Soils from the ACS facility and most of the Kapica Drum property are devoid of vegetation and do not support appreciable ecological communities. Other environmental media and the surface water/sediment locations on the Site plant property do not reflect contaminants or concentrations available to the natural ecosystem.

Maximum values for contaminants detected in the environmental media are included in Table 7-39. Values are expressed in exponential notation as milligram per kilogram or milligram per liter to be consistent with the Human Health Evaluation (Section 7.1). Table 7-39 also includes toxicological and chemical data that are used to evaluate relative importance of the contaminants found in environmental media.

Representative contaminants for consideration of effects on area species are selected based on the results of Table 7-40. Relative importance of contaminants is based on toxicity and chemical fate and transport properties. Importance factors are developed for the contaminants and are

expressed as percents of the total importance to demonstrate the relative importance of individual contaminants.

Importance factors based on contaminant concentration and toxicity are assessed by reference doses (RfDs) for non-carcinogenic toxicological effects. The chemical values from Table 7-39 represent either the maximum values found in each medium or the upper bound of the 95% confidence limit for that medium. This concentration for each contaminant is divided by an RfD. Thus, a contaminant present at a high concentration with a low RfD (greater sensitivity to the contaminant) yields a greater importance factor. A contaminant present in large concentrations, but relatively less toxic (higher RfD value) yields a lesser importance factor, as do contaminants present in smaller concentrations. Species-specific RfDs are taken from HEAST (U.S. EPA, 1991), with uncertainty factors for human populations removed. The factor (X10) for extrapolation from animal to human species and the factor (X10) for average individual to most sensitive individual have been removed; the factor for subchronic to chronic effects (X10) has been retained.

Importance factors based on contaminant concentration and chemical factors consider the octanol-water coefficient (K_{OC}) as a factor in the distribution of organic contaminants in environmental media. Maximum contaminant concentrations for surface soils, surface water, and sediments are multiplied by the K_{OC} values to demonstrate the preferential affinity of organic contaminants to organisms contacting these media. The maximum contaminant values for the groundwater medium are divided by the K_{OC} values because the subsurface soils below the water table preferentially retard the contaminants from groundwater, and those chemicals with high K_{OC} values retarded most.

Results of the evaluation of importance of contaminants are expressed as percent of total importance are presented in Table 7-40. For each environmental medium, the organic and inorganic contaminant with the greatest percent importance, based on concentration and toxicity, are evaluated further in this Ecological Assessment. These contaminants include the following:

- Surface soils
  - toluene
  - cadmium
- Sediments
  - bis(2-ethylhexyl)phthalate (DEHP)
  - mercury
- Surface water
  - 4-methylphenol
  - manganese
- Groundwater
  - 2-butanone
  - manganese

In addition, PCBs were considered because of their affinity for biological tissues and their percent importance based on chemical factors (K_{OC}).

Tentatively identified compounds (TICs) were identified in media of environmental concern. Results of the TIC analyses are included in Tables 7-2 (shallow groundwater), 7-7 (surface soils), 7-9 (surface waters), and 7-10 (sediments). Concentrations of TICs are generally less than those of contaminants selected from the TCL for environmental media. Because of the generally lower concentrations and the lack of available toxicological data for developing RfDs for TICs, they are not quantitatively evaluated in the Ecological Assessment.

7.2.6 Exposure Assessment

7.2.6.1 Exposure Pathways

Biological populations are potentially exposed to Site contaminants. Potential exposure pathways for plant and animal populations at the Site and in the surrounding water and wetland areas are listed in Table 7-41.

Terrestrial Habitat

In the terrestrial environment of the Site, plant species may penetrate the cover soils and have root systems in contact with contaminated soils. Burrowing animals may also come into contact with contaminated soils by penetrating surface cover. Ground nesting birds and surface dwelling mammals, reptiles, and amphibians may also be exposed to contaminants that may be at the Site surface due to chemical migration or erosion of cover soils.

Although plant and animal species may absorb some contaminants by direct surface contact with soils, most exposure would be by ingestion of contaminants. Burrowing mammals and invertebrates could ingest soil in the course of movement through the soil. These and other species could also ingest soils incidentally in the course of consumption of soil-dwelling food species. Except for chemicals that bioaccumulate, the greatest exposure to terrestrial species would be the ingestion of contaminated soils.

Wetland Habitat

In the wetlands, potential sediment contamination may have resulted from erosion of soils from source areas or discharge of contaminated groundwater through the sediments. Plants in wetlands have the opportunity to extract contaminants, especially metals, from wetland sediments. Wetland mammals, birds, invertebrates (e.g., crayfish), and plants likely are exposed to subsurface water. These species and fish are exposed to wetland surface waters, when present.

The major role of contamination uptake for plant species is by surface absorption, which applies to bioaccumulative organic compounds and metals. For animal species, direct absorption of bioaccumulative contaminants occurs, but most species are exposed to contaminants by incidental ingestion of contaminated sediments.

Portions of wetlands seasonally may contain sufficient standing water to support fish species, as well as plants, invertebrates, and wetland mammals and birds. Plants (macrophytes and algae) can potentially be exposed to Site contaminants from surface water or sediment. Wetland mammals and birds, invertebrates, and fish have contact with water and sediments and can biomagnify contaminants through a foodchain.

Ditch Habitat

In the Site area, plants (including macrophytes and algae), fish, invertebrates, and wetland mammals and birds have direct contact with surface water in ditches. Macrophytes and animal species also may have contact with the sediments. Potential biomagnification of contaminants in foodchains may occur among the species present. Larger mammals, such as deer, may also have access to contaminants in the ditches.

7.2.6.2 Populations of Concern

The effects on populations representative of the Site area are considered to assess the effects of Site contaminants on the surrounding environment. Contaminants are assessed against specific endpoints of population parameters, such as growth or limits on reproduction. Ecological endpoints selected for representative species of concern are listed in Table 7-42.

Terrestrial habitats on-Site include approximately 1 to 2 acres of open field in the off-Site disposal area and the Kapica-Pazmey property, approximately 33 acres of landfill open area, and 2 to 4 acres of wooded land along Colfax Avenue. These areas likely support small mammal populations, including various species of field rats, mice, voles and woodchucks that live on the ground or burrow into or through it. Because many of these species are rodents, ecological endpoints developed for the laboratory rat are applied to assess the effects on these species. Assessment values are described for a burrowing rodent, which could apply to several species. For the burrowing rodent, incidental ingestion of soil and consumption of surface water (ditches) and shallow groundwater (wetland water) are assumed to be the primary routes of exposure.

The potential effects of Site contaminants and area wetlands are assessed by the assumption of the presence of mink (Mustela vison) at the Site. Although mink were not observed during the course of RI field activities, the F&WS requested consideration of this species because of the potential presence of mink habitat in the Site area and the toxicological data base available for this species. Mink are carnivorous wetland mammals sensitive to PCBs. Assessing the effects of PCBs on mink tests the effects of the most bioaccumulative contaminant detected at the Site on a species sensitive to PCBs.

The contaminants selected for the assessment of surface water (including shallow groundwater) and sediment concentrations are applied to a fish species, the bluegill sunfish (Lepomis macrochirus). This species is common in northern Indiana surface waters. Although effects of environmental contaminants are well documented, most tests have assessed lethality to 50% of a test population (LC_{50}). For the contaminants considered in this ecological assessment, values for the onset of toxicity or for sublethal effects were not available. Ecological endpoints in Table 7-42 for aquatic species include effects on other species because these values are more sensitive to the contaminants than bluegill LC_{50} values. The contaminants in surface water (including shallow groundwater) and sediments are assumed to present the primary exposure to the bluegill in the course of feeding.

Exposure concentrations are estimated for representative species of concern from concentrations analyzed in media of concern. Estimates of intake rates or concentrations are presented in Tables 7-43, 7-45, and 7-46 for representative species. Calculations and assumptions for the burrowing rodent and the bluegill are presented in Table 7-44.

In addition to RfD values for rodent species, Table 7-47 includes values for the onset of toxicity to rodent species by the oral pathway (ingestion). The onset of toxicity values are one or more orders of magnitude greater than the animal species-specific RfD values.

7.2.7 Toxicity Assessment

Exposure of populations to contaminants at the site may result in toxicological effects. These effects vary by the level of contamination to the exposed populations. Documentation is available for various species for effects commonly ranging from the conservative No Observed Adverse Effect Level (NOAEL) to the more drastic LC_{50} (Lethal Concentration to 50% of a test population). Criteria pertinent to the ecological endpoints selected for the species of concern represent the conservative end of this range. Values for these parameters are included in Table 7-47.

Values for the onset of toxicity to bluegills are not available for the evaluated contaminants. Table 7-48 presents LC_{50} values to indicate concentrations that are toxic to a species of this assessment. The EE values included in Table 7-42 for aquatic species are more conservative than the bluegill LC_{50} values.

Most animal species have sufficiently short life spans that a long term disease, such as cancer, is not in evidence in localized populations to the extent that it affects population densities. Information concerning the presence of specific endangered species, for which cancer effects may need to be addressed to protect a limited number of individuals, is not available. Therefore, the potential for cancer effects on animal species is not addressed in the Ecological Assessment.

7.2.8 Risk Characterization

Exposures of representative species of concern have been estimated for representative contaminants of concern. For the burrowing rodents, the exposures have been developed in the format of intake of contaminants expressed as a fraction of body weight per day (mg/kg-day) and are summarized in Table 7-43. The intakes are assumed for a lifetime, or chronic, exposure because the representative species have ranges that could be restricted to the Site or adjacent wetland or surface water.

Potential effects of the selected contaminants of concern have been summarized from the scientific literature. Results of chronic exposure (greater than or equal to a lifetime of the test species) have been included where such values are available. Endpoints of studies resulting in initial effects to the test populations, especially those effects on reproduction or population maintenance (e.g., teratogenic effects) have been evaluated, where possible. These ecological endpoints are included in Table 7-42. Other pertinent population data for the contaminants of concern are included in Table 7-47 as an indication of similar population parameters.

For the burrowing rodents, the exposure concentrations of the representative contaminants of concern, expressed as DI values, are compared to the ecological endpoints (EE) for population stability (e.g., reproduction effects, etc.), expressed as EE values, in Table 7-42. The comparisons are expressed as ratios of potential intake values to the population effect values, or CD/EE. This ratio results in a value defined for human health risk assessments (RAGS, Vol. I as the Hazard Quotient (HQ) for the contaminants of concern to the selected species of concern A summation of the HQs is performed for human populations to obtain an accumulative Hazar Index for the Site. For the Ecological Assessment, only representative contaminants of greate concern were addressed to present an indication of potential ecological effects of S contaminants. Therefore, a summary Hazard Index including all contaminants has not b developed. Hazard Quotient values for burrowing rodents are shown in Table 7-43.

A Hazard Quotient value of ≥ 1 indicates that the species of concern has an intake of a particular contaminant of concern at a dose rate that may be sufficient to affect the population stability of that species. Burrowing rodent populations may be adversely affected by Site soil contaminants, based on HQ values of 3 for toluene and 10 for cadmium. These values represent the likely maximum values for shallow or surface soils. Exposure of these species to surface water (including shallow groundwater) and sediments is not likely to affect the populations, based on the HQ values for these media.

The exposure of mink to PCBs through biomagnification is addressed by assuming the concentrations in prey species are represented by concentrations in environmental media in which the prey occur, modified by the factors included in Table 7-45. For the mink, the sum of the predicted concentrations of PCBs in the food sources is considered as the animals intake. A value for a permissible tissue concentration for mink diet from the literature (Platonow and Karstad, 1973) is the EE which functions as the RfD. From these values, a HQ is derived as shown in Table 7-45. An HQ (i.e., 1) was derived based on the assumption that mink would eat small game and amphibians but no fish or crayfish. Based on site conditions during the RI, this seemed reasonable. The HQ value of slightly greater than 1 indicates a potential stress to the mink population. Assuming there are fish and crayfish in the ditch that mink can consume, an HQ slightly greater than 1 was calculated. Therefore, if mink consume contaminated fish and crayfish there is not an increased potential that the population may be harmed. This is due to the low concentrations (i.e., <500 ug/kg) of PCBs detected in ditch sediment.

Because dose concentrations similar to those applied to the mammalian species are not available to develop RfD values for aquatic species, ecological endpoints are expressed as exposure concentrations in milligrams per liter. The time factor for the exposure concentrations is assumed to be on a daily basis. HQ values for bluegills are presented in Table 7-46. The values for the selected contaminants are low (HQ<1), suggesting little likelihood of adverse impact to aquatic species from Site contaminants.

7.2.8.1 Water Quality Criteria

The U.S. EPA has developed Ambient Water Quality Criteria (AWQC) for the protection of freshwater life for PCBs, some organochlorine pesticides and heavy metals. In addition to these criteria, the U.S. EPA has used the Lowest Reported Toxic Concentration values for some volatile and semi-volatile organic compounds as criteria. The AWQC are presented in Tables 7-48 and 7-49.

Table 7-48 presents predicted surface water concentrations for contaminants detected in shallow groundwater at the Site. Maximum contaminant concentrations are divided by retardation factors to produce predicted surface water values. As indicated in Table 7-48, excursions of AWQC are not predicted to occur as a result of groundwater discharge to the wetlands.

Maximum surface water concentrations are compared to both acute and chronic AWQC in Table 7-49. The chronic AWQC for PCB is exceeded. This excursion occurred at SW02, one of the ponds on the active ACS Facility. At other locations the AWQC is not exceeded. Chronic AWQC for four metals copper, iron, lead, and zinc) are exceeded.[2] The maximum surface water concentration for copper also exceeds the acute AWQC. The excursions are by a factor of approximately 1 to 2 1/2 times the AWQC value except for lead, for which the maximum concentration exceeded the AWQC by a factor of approximately 30. The AWQC are conservative values for the protection of sensitive aquatic species ; exceedance of a criteria does not necessarily mean the indigenous species at the site will be harmed, but the potential does exist and increases as the magnitude of the exceedance increases. Also, AWQC are not developed to account for the potential for interactive effects among chemicals when a species is exposed to a chemical mixture, such as found at the Site. Therefore, there is the potential that concentrations of chemicals below (i.e., as a result of a synergistic effect) or above (i.e., as a result of an antagonistic effect) their respective AWQC may be harmful to sensitive species wher

2 AWQC for inorganic analytes are depended on hardness. To assess whether a surface water metal concentrati exceeded its AWQC at a particular location, hardness datum was used to calculate the appropriate hardn corrected AWQC for the locations where metals exceeded their AWQC uncorrected for hardness. Refer to Ta 7-50 for the equations used to calculate hardness and the hardness corrected AWQC for each metal.

they are exposed to chemical mixtures. This is an inherent uncertainty which cannot be quantitatively addressed based on the current level of knowledge in the area of aquatic toxicology.

7.2.8.2 Sediment Quality Criteria

Sediment quality criteria (SQC) can be developed on a site-specific basis to assess the potential toxicity of sediment levels of contaminants to benthic species. SQC are applicable for those sediments on-site which are continuously inundated with water (e.g., can support benthic invertebrates). SQC are derived by the equilibrium partitioning procedure (U.S. EPA, undated). This procedure assumes that contaminants bound to sediment are in equilibrium with the water in the sediment pore space (i.e., pore water). Sediment pore water is assumed to be the primary medium of exposure to contaminants for sediment-dwelling aquatic organisms.

Sediment quality criteria have been classically developed for nonpolar organic contaminants, but the approach can be used to develop SQC for any organic or inorganic contaminant that is bound by sediment organic matter.

For organic contaminants, partitioning procedure utilizes a partition coefficient to estimate the organic compounds concentration in pore water. A partition coefficient, defined as the ratio of the concentration of a substance in one medium to its concentration in another, can be applied to correlate a sediment concentration with a water concentration for a particular organic compound. The partition coefficient for an organic substance between sediment organic carbon (OC) and water is referred to as a sediment water partition coefficient (K_{OC}) and is represented by the following equation.

$$K = \frac{\text{mg substance/kg sediment OC}}{\text{mg substance/L water}}$$

The SQC represents the concentrations of a substance in sediment that will not result in adverse effects to aquatic life. The SQC is developed using the ambient water quality criterion (AWQC) and the K_{OC} for the substance. This following relationship is used to calculate a "safe" sediment concentration (i.e., SQC).

$$SQC = K_{OC} \times AWQC \times \% OC$$

SQC are presented in Table 7-49. For organic compounds, derived chronic SQC are exceeded for DEHP, PCB, and heptachlor epoxide. The acute SQC for heptachlor epoxide is also exceeded. Heptachlor epoxide occurred in only one location, at SD08. This location is a small pond on the eastern side of Colfax Avenue. Sediment concentrations of DEHP do not appear to be likely to adversely affect feeding of burrowing rodents and fish species, as assessed by the HQ values for DEHP in Tables 7-43 and 7-46. The occurrence of the maximum concentration of PCBs in sediments at a concentration greater than the SQC may be correlated to biomagnification concerns for a potential mink population.

For metals, SQC can be developed where distribution coefficients (K_d) are available. The K_d values can be a substituted for the K_{OC} values in the above equation. K_d values for two metals found in sediments at the ACS Site are available and include the percent organic carbon factor in the K_d value (Chapman, 1989). These factors, and their corresponding SQC, are presented fo copper and mercury in Table 7-49. The SQC is not exceeded for copper and by a factor of les than 2 for mercury. Sediment concentrations of mercury do not appear to be likely to adverse effect the feeding of burrowing rodents and fish species, as assessed by the HQ values f mercury in Tables 7-43 and 7-46.

7.2.8.3 Endangered Species and Significant Areas

The F&WS report suggests that the area around Griffith, Indiana may present habitat for se Federal or State endangered or threatened species. The historical use of the area for indu and agricultural purposes, with their drastic modifications of the landscape, suggests th continued presence of habitat for some of these sensitive species may no longer exist . W did not observe evidence of endangered or threatened species , but a rigorous field cen not conducted, because it was not part of the approved work scope. Rather, the cen

limited to field observations by a staff field biologist in May of 1990. U.S. F&WS personnel noted the presence of the king rail, a State of Indiana threatened bird. The F&WS anticipates the presence of other endangered or threatened species on Site based on observations of available habitat (Sparks, personal communications, 1991).

The ACS Site is not included as a designated area of special biological significance by the Indiana Department of Natural Resources (IDNR). Approximately 1.2 miles west of the Site is the Hoosier Prairie State Nature Preserve, a relatively undeveloped property managed by the IDNR.

7.2.9 Summary of the ACS Ecological Assessment

The ACS Site includes some natural habitats as well as industrial properties. Although there is limited open surface water habitat, there are extensive wetlands on the Site and in the Site area. Terrestrial habitats include open areas on the new and old landfills and the Kapica-Pazmey property. Organic and inorganic contaminants likely to present the greatest hazard were evaluated for environmental media: surface soils, sediments, surface water, and shallow groundwater.

In terrestrial habitats, burrowing rodent populations exposed to maximum contaminant concentrations in soils at the Kapica-Pazmey property likely receive unacceptable exposures to concentrations of organic and inorganic contaminants, as represented by toluene and cadmium. Exposures of these populations to representative contaminants in sediments (DEHP, mercury), surface waters (4-methylphenol, manganese), and shallow groundwater (2-butanone, manganese), do not appear likely to present an environmental stress.

Limited open water areas do not appear to present ecological risks to fish species. Maximum concentrations for contaminants for sediments (DEHP, mercury), surface waters (4-methylphenol, manganese), and wetland waters (represented by shallow groundwater/2-butanone, manganese) are not likely to adversely affect bluegills, if populations of this species are present.

The potential for contaminant bioaccumulation is investigated by the evaluation of PCBs, a bioaccumulative contaminant, to mink, a wetland mammal sensitive to PCBs. If minks were present at the Site and consume a diet typically reported in the literature, they may suffer adverse population effects.

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TABLE

TABLE 7-39
INFORMATION FOR CHEMICALS DETECTED IN MEDIA OF POTENTIAL CONCERN
ACS Site, Griffith, Indiana

Compound	Media Chemical Concentrations				Chemical Toxicity and Chemistry Information (1)				
	Surface Soil (SS) (mg/kg)	Sediment (SD) (mg/kg)	Surface Water (SW) (mg/L)	Upper Aquifer (GW) (mg/L)	Spp.	UF	RfD Oral	Spp. RfD Oral	Koc (ml/g)
Chloromethane				6.80e-02			8.0e+00	0.0e+00	3.50e+01
Bromomethane					r	100	1.4e-03	1.4e-01	
Vinyl chloride				7.20e-01			0.0e+00	0.0e+00	5.70e+01
Chloroethane		1.16e-02	3.00e-02	2.00e+00			0.0e+00	0.0e+00	2.20e+00
Methylene chloride	2.00e-01	2.58e-02		3.80e-01	r	100	6.0e-02	6.0e+00	8.80e+00
Acetone	9.70e-01		3.80e-01	9.90e+01	r	100	1.0e-01	1.0e+01	2.20e+00
Carbon disulfide					rab	100	1.0e-01	1.0e+01	5.40e+01
1,1-Dichloroethene					r	100	9.0e-03	9.0e-01	6.50e+01
1,1-Dichloroethane	1.50e-01		2.00e-03	2.40e+00			0.0e+00	0.0e+00	3.00e+01
1,2-Dichloroethene (cis)	7.60e+00	5.60e-03	3.00e-03	4.00e-01	r	300	1.0e-02	3.0e+00	4.90e+01
1,2-Dichloroethene (trans)					m	100	2.0e-02	2.0e+00	
Chloroform	1.00e-02	5.93e-03			d	100	1.0e-02	1.0e+00	3.10e+01
1,2-Dichloroethane							0.0e+00	0.0e+00	1.40e+01
2-Butanone		8.86e-03	1.40e-01	2.20e+02	r	100	5.0e-02	5.0e+00	4.50e+00
1,1,1-Trichloroethane	9.00e-03	3.08e-03			sp	100	9.0e-02	9.0e+00	1.52e+02
Carbon tetrachloride					r	100	7.0e-04	7.0e-02	1.10e+02
Vinyl acetate							1.0e+00	0.0e+00	
Bromodichloromethane					m	100	2.0e-02	2.0e+00	
1,2-Dichloropropane	1.90e-02						0.0e+00	0.0e+00	5.10e+01
cis-1,3-Dichloropropene					r	1000	3.0e-04	3.0e-01	
Trichloroethene	1.70e+02			4.50e-02			0.0e+00	0.0e+00	1.26e+02
Dibromochloromethane					r	100	2.0e-02	2.0e+00	
1,1,2-Trichloroethane					m	100	4.0e-03	4.0e-01	5.60e+01
Benzene	3.20e+00	4.30e-01	4.60e-01	1.00e+02			0.0e+00	0.0e+00	8.30e+01
trans-1,3-Dichloropropene					r	100	3.0e-04	3.0e-02	
Bromoform					r	100	2.0e-02	2.0e+00	
4-Methyl-2-pentanone	2.70e+02		4.90e-02	5.40e+01	r	100	5.0e-02	5.0e+00	2.05e+01
2-Hexanone				1.80e+00			0.0e+00	0.0e+00	3.90e+00
Tetrachloroethene	7.90e+02			2.00e-01	m	100	1.0e-02	1.0e+00	3.64e+02
1,1,2,2-Tetrachloroethane							0.0e+00	0.0e+00	1.18e+02
Toluene	1.90e+04	4.89e-02	8.00e-03	2.30e+00	r	100	2.0e-01	2.0e+01	3.00e+02
Chlorobenzene	6.20e+00			9.60e-02	d	100	2.0e-02	2.0e+00	3.30e+02
Ethylbenzene	4.30e+03	1.31e-02	5.40e-03	1.10e+00	r	100	1.0e-01	1.0e+01	1.10e+03
Styrene	2.30e+01				d	100	2.0e-01	2.0e+01	1.89e+02
Xylenes (mixed)	2.30e+04	1.60e-02	3.50e-02	3.00e+00	r	100	2.0e+00	2.0e+02	3.30e+02
SEMIVOLATILES									
Phenol	2.80e+01	1.90e-01	4.50e-02	2.40e-01	r	100	6.0e-01	6.0e+01	1.42e+01
bis(2-Chloroethyl) ether		3.61e-01	7.70e-02	2.50e-01	m	100	0.0e+00	0.0e+00	1.39e+01
2-Methylphenol					r	100	5.0e-03	5.0e-01	1.55e+01
				3.00e-03			0.0e+00	0.0e+00	1.70e+03
				1.00e-02			0.0e+00	0.0e+00	1.70e+03
					r	100.	3.0e-01	3.0e+01	1.28e+01
					r	100	9.0e-02	9.0e+00	1.70e+03
							5.1e-02	5.0e+00	5.00e+02

TABLE 7-39
INFORMATION FOR CHEMICALS DETECTED IN MEDIA OF POTENTIAL CONCERN
ACS Site, Griffith, Indiana

Compound	Media Chemical Concentrations				Chemical Toxicity and Chemistry Information (1)				
	Surface Soil (SS) (mg/kg)	Sediment (SD) (mg/kg)	Surface Water (SW) (mg/L)	Upper Aquifer (GW) (mg/L)	Spp.	UF	RfD Oral	Spp. RfD Oral	Koc (ml/g)
bis(2-Chloroisopropyl)ether		5.77e-01	2.98e-02	3.80e-01	m	100	4.0e-02	4.0e+00	6.10e+01
4-Methylphenol	4.60e+00	2.70e-01	5.90e-01	2.20e+00	r	100	5.0e-02	5.0e+00	5.00e+02
N-Nitroso-di-n-dipropylamine							8.0e+00	0.0e+00	
Hexachloroethane					r	100	1.0e-03	1.0e-01	
Nitrobenzene					m	1000	5.0e-04	5.0e-01	
Isophorone	9.70e+01		5.00e-03	3.50e-02	d	100	2.0e-01	2.0e+01	2.49e+01
2-Nitrophenol							0.0e+00	0.0e+00	
2,4-Dimethylphenol	4.90e+00	3.62e-01	1.88e-02	1.10e-01	m	300	2.0e-02	6.0e+00	4.20e+01
bis(2-Chloroethoxy)methane							0.0e+00	0.0e+00	
2,6-Dichlorophenol					r	100	3.0e-03	3.0e-01	3.80e+02
1,2,4-Trichlorobenzene							1.3e-03	0.0e+00	9.20e+03
Naphthalene	9.70e+01	3.57e-01		7.10e-02	r	1000	4.0e-03	4.0e+00	6.49e+02
4-Chloroaniline					r	300	4.0e-03	1.2e+00	
Hexachlorobutadiene					r	100	2.0e-03	2.0e-01	2.90e+04
4-Chloro-3-methylphenol			2.00e-03	5.00e-03			0.0e+00	0.0e+00	4.70e+01
2-Methylnaphthalene	5.60e+01	3.41e-01		2.70e-02			0.0e+00	0.0e+00	7.12e+02
Hexachlorocyclopentadiene					r	100	7.0e-05	7.0e-01	
2,4,6-Trichlorophenol							0.0e+00	0.0e+00	2.00e+03
2,4,5-Trichlorophenol	1.70e-01				r	300	1.0e-01	3.0e+01	8.90e+01
2-Chloronaphthalene							8.0e-02	0.0e+00	7.12e+02
2-Nitroaniline							0.0e+00	0.0e+00	
Dimethylphthalate	1.40e+00						1.0e+00	0.0e+00	4.03e+01
Acenaphthylene							0.0e+00	0.0e+00	2.50e+03
3-Nitroaniline							0.0e+00	0.0e+00	
Acenaphthene	3.60e-01				m	300	6.0e-02	1.8e+01	4.60e+03
2,4-Dinitrophenol					h	1000	2.0e-03	2.0e+00	
4-Nitrophenol							0.0e+00	0.0e+00	2.12e+01
Dibenzofuran	4.30e-01	2.30e-01					0.0e+00	0.0e+00	8.20e+02
2,4-Dinitrotoluene							0.0e+00	0.0e+00	4.58e+01
Diethylphthalate	5.00e+00			9.00e-03	r	100	8.0e-01	8.0e+01	1.42e+02
4-Chlorophenyl-phenylether							0.0e+00	0.0e+00	
Fluorene	6.20e-01	3.95e-01			m	300	4.0e-02	1.2e+01	7.30e+03
4-Nitroaniline							0.0e+00	0.0e+00	
4,6-Dinitro-2-methylphenol							0.0e+00	0.0e+00	
N-nitrosodiphenylamine	4.30e+00						0.0e+00	0.0e+00	4.78e+02
4-Bromophenyl-phenylether							0.0e+00	0.0e+00	8.20e+02
Hexachlorobenzene		1.40e-01			r	100	8.0e-04	8.0e-02	3.90e+03
Pentachlorophenol	1.50e+00	2.30e-01		3.00e-03	r	100	3.0e-02	3.0e+00	5.30e+04
Phenanthrene	4.30e+00	3.77e-01					0.0e+00	0.0e+00	1.40e+04
Anthracene	6.60e-01	1.00e-01					0.0e+00	0.0e+00	1.40e+04
Di-n-butylphthalate	9.40e+01	1.70e-01		2.00e-03	r	100	1.0e-01	1.0e+01	1.70e+05
Fluoranthene	3.40e+00	5.24e-01			m	300	4.0e-02	1.2e+01	3.80e+04
Pyrene	2.30e+00	5.00e-01			m	300	3.0e-02	9.0e+00	3.80e+04
Butylbenzylphthalate	5.10e+01	1.70e-01			r	100	2.0e-01	2.0e+01	2.43e+03
3,3'-Dichlorobenzidine							0.0e+00	0.0e+00	
Benzo(a)anthracene(c)	2.40e+00	4.57e-01					0.0e+00	0.0e+00	1.38e+06
	1.30e+00	4.29e-01					0.0e+00	0.0e+00	2.00e+05

TABLE 7-39
INFORMATION FOR CHEMICALS DETECTED IN MEDIA OF POTENTIAL CONCERN
ACS Site, Griffith, Indiana

Compound	Media Chemical Concentrations				Chemical Toxicity and Chemistry Information (1)					
	Surface Soil (SS) (mg/kg)	Sediment (SD) (mg/kg)	Surface Water (SW) (mg/L)	Upper Aquifer (GW) (mg/L)	Spp.	UF	RfD Oral	Spp. RfD Oral	Koc (ml/g)	
bis(2-ethylhexyl)phthalate	5.40e+02	5.07e+00		5.00e-02	gp	100	2.0e-02	2.0e+00	6.92e+02	
Di-n-octyl Phthalate	3.80e+01				r	100	2.0e-02	2.0e+00	6.92e+02	
Benzo(b)fluoranthene(c)	3.90e+00	6.24e-01					0.0e+00	0.0e+00	5.50e+05	
Benzo(k)fluoranthene(c)	3.90e+00	6.36e-01					0.0e+00	0.0e+00	5.50e+05	
Benzo(a)pyrene(c)	1.40e+00	4.18e-01					0.0e+00	0.0e+00	5.50e+06	
Idene(1,2,3-cd)pyrene(c)	8.20e-01	3.24e-01					0.0e+00	0.0e+00	1.60e+06	
Dibenz(a,h)anthracene(c)	2.70e-01	2.08e-01					0.0e+00	0.0e+00	3.30e+06	
Benzo(g,h,i)perylene	1.10e+00	3.59e-01					0.0e+00	0.0e+00	1.60e+06	
Total-Carcinogenic PAHs	1.40e+01	3.09e+00					0.0e+00	0.0e+00		
PESTICIDE/PCB										
alpha-BHC							0.0e+00	0.0e+00	3.80e+03	
beta-BHC							0.0e+00	0.0e+00	3.80e+03	
delta-BHC							0.0e+00	0.0e+00		
gamma-BHC (Lindane)					r	100	3.0e-04	3.0e-02	1.08e+03	
Heptachlor					r	300	5.0e-04	1.5e-01		
Aldrin	8.80e-02				r	100	3.0e-05	3.0e-03	9.60e+04	
Heptachlor epoxide		2.66e-02					1.3e-05	0.0e+00	2.20e+02	
Endosulfan I	4.20e-02				r	300	5.0e-05	1.5e-02	2.43e+06	
Dieldrin							5.0e-05	0.0e+00		
4,4'-DDE							0.0e+00	0.0e+00	4.40e+06	
Endrin					d	100	3.0e-04	3.0e-02		
Endosulfan II					r	300	5.0e-05	1.5e-02		
4,4'-DDD	1.50e-01						0.0e+00	0.0e+00	7.70e+05	
Endosulfan sulfate							5.0e-05	0.0e+00		
4,4'-DDT					r	100	5.0e-04	5.0e-02	2.43e+05	
Methoxychlor					r	100	5.0e-03	5.0e-01		
Endrin ketone							0.0e+00	0.0e+00	1.70e+03	
alpha-Chlordane					r	100	6.0e-05	6.0e-03		
gamma-Chlordane					r	100	6.0e-05	6.0e-03		
Toxaphene							0.0e+00	0.0e+00		
Total - PCBs	3.29e+02	4.11e+00	8.40e-04	2.96e-02			0.0e+00	0.0e+00	5.30e+05	Total
METALS										
Aluminum	1.32e+04		9.60e-01	2.80e-01			0.0e+00	0.0e+00		
Antimony	8.48e+01				r	100	4.0e-04	4.0e-02		
Arsenic			4.50e-02	4.32e-02	r	1	4.0e+00	4.0e+00		
Barium	5.73e+03	7.12e-02	3.22e-01	1.84e+00	r	100	7.0e-02	7.0e+00		
Beryllium			2.69e-04	2.50e-04	r	100	5.0e-03	5.0e-01		
Cadmium (food/soil)	1.74e+02		7.20e-04	3.10e-03	r	1	4.0e-02	4.0e-02		
					r	100	1.0e+00	1.0e+02		
	[illegible]	4.54e-02	2.80e-02	3.90e-03	r	500	5.0e-03	2.5e+00		
							0.0e+00	0.0e+00		
							0.0e+00	0.0e+00		

TABLE 7-39
INFORMATION FOR CHEMICALS DETECTED IN MEDIA OF POTENTIAL CONCERN
ACS Site, Griffith, Indiana

Compound	Media Chemical Concentrations				Chemical Toxicity and Chemistry Information (1)				
	Surface Soil (SS) (mg/kg)	Sediment (SD) (mg/kg)	Surface Water (SW) (mg/L)	Upper Aquifer (GW) (mg/L)	Spp.	UF	RfD Oral	Spp. RfD Oral	Koc (ml/g)
Iron	7.01e+04		1.43e+01	2.18e+02			0.0e+00	0.0e+00	
Lead	1.42e+04		2.38e-02	4.68e-03			0.0e+00	0.0e+00	
Manganese	1.54e+03		1.85e+00	4.25e+00	r	100	1.0e-01	1.0e+01	
Mercury	9.50e+00	1.22e-03		1.70e-03	r	100	3.0e-04	3.0e-02	
Nickel	1.97e+02	2.06e-02	8.00e-02	5.30e-02	r	300	2.0e-02	6.0e+00	
Potassium			3.00e+01	9.58e+01			0.0e+00	0.0e+00	
Selenium	1.72e+01	5.73e-04	1.83e-03	6.20e-03			0.0e+00	0.0e+00	
Silver	2.48e+01				h		0.0e+00	0.0e+00	
Sodium			8.23e+01	4.44e+02			0.0e+00	0.0e+00	
Thallium				4.00e-03	r	300	7.0e-05	2.1e-02	
Vanadium	4.77e+01	3.45e-02		2.59e-02	r	0	7.0e-03	0.0e+00	
Zinc	1.58e+04		8.80e-02	8.86e-01	h		0.0e+00	0.0e+00	
Cyanide	6.62e+01			1.00e-02	r	500	2.0e-02	1.0e+01	

TABLE 7-39
INFORMATION FOR CHEMICALS DETECTED IN MEDIA OF POTENTIAL CONCERN
ACS Site, Griffith, Indiana

Notes:

- Chemical concentrations for media of concern are represented by the lower of the upper bound 95% confidence limit of the geometric mean or the maximum chemical concentration. TCL organics detected in media of concern were selected as chemicals of potential concern as were inorganics above natural background concentrations (refer to Tables 5-1 through 5-3 in Appendix 5).

- Toxicity information was obtained from the Health Effects Summary Tables (HEAST; U.S. EPA 1991). Chronic human reference doses (RfDs) based on animal data were used to assess small gene chemical toxicity, with modification. The chronic human RfDs were divided by their respective uncertainty factor to arrive at an estimate of the appropriate chronic reference for the species (e.g., rat) which the human RfD was based upon. For chronic RfDs which were developed based on subchronic animal data, the 10-fold uncertainty factor applied to estimate the chronic RfD was retained.

- A detailed definition of the organic carbon/water partition coefficient (Koc), as well as sources for values, is presented in Table 7-14 of this report.

Legend:

Spp. = species for which the human RfD was based
- rs rat
- rabs rabbit
- ms mouse
- ds dog
- gps guinea pig
- hs human

UF= uncertainty factor associated with RfD, less the 10 fold factor to extrapolate from subchronic to chronic effects studies.
RfD oral = human oral reference dose
Spp. RfD oral = Species-specific oral reference dose
Koc= soil organic carbon/water partition coefficient

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TABLE 7-40
SELECTION OF CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN
ACS Site, Griffith, Indiana

Compound	Screening Based on Chemical Concentration and Toxicity: Importance Factor SS	SD	SV	GW	Percent of Total Importance SS	SD	SV	GW	Screening Based on Chemical Concentration and Chemistry: Importance Factor SS	SD	SV	GW	Percent of Total Importance SS	SD	SV	GW
Chloromethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	1.9e-03	0	0	0	0
Bromomethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Vinyl chloride	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	1.3e-02	0	0	0	0
Chloroethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	2.6e-02	6.6e-02	9.1e-01	0	0	0	1
Methylene chloride	3.3e-02	4.3e-03	0.0e+00	6.3e-02	0	0	0	0	1.8e+00	2.3e-01	0.0e+00	4.3e-02	0	0	0	0
Acetone	9.7e-02	0.0e+00	3.8e-02	9.9e+00	0	0	18	15	2.1e+00	0.0e+00	8.4e-01	4.5e+01	0	0	0	45
Carbon disulfide	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,1-Dichloroethene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,1-Dichloroethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	4.5e+00	0.0e+00	6.0e-02	8.0e-02	0	0	0	0
1,2-Dichloroethene (cis)	2.5e+00	1.9e-03	1.0e-03	1.3e-01	0	0	0	0	3.7e+02	2.7e-01	1.5e-01	8.2e-03	0	0	0	0
1,2-Dichloroethene (trans)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Chloroform	1.0e-02	5.9e-03	0.0e+00	0.0e+00	0	0	0	0	3.1e-01	1.8e-01	0.0e+00	0.0e+00	0	0	0	0
1,2-Dichloroethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2-Butanone	0.0e+00	1.8e-03	2.8e-02	4.4e+01	0	0	14	67	0.0e+00	4.0e-02	6.3e-01	4.9e+01	0	0	0	49
1,1,1-Trichloroethane	1.0e-03	3.3e-04	0.0e+00	0.0e+00	0	0	0	0	1.4e+00	4.6e-01	0.0e+00	0.0e+00	0	0	0	0
Carbon tetrachloride	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Vinyl acetate	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Bromodichloromethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,2-Dichloropropane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	9.7e-01	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
cis-1,3-Dichloropropene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Trichloroethene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	2.1e+04	0.0e+00	0.0e+00	3.6e-04	0	0	0	0
Dibromochloromethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,1,2-Trichloroethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Benzene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	2.7e+02	3.6e+01	3.8e+01	1.2e+00	0	0	5	1
trans-1,3-Dichloropropene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Bromoform	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4-Methyl-2-pentanone	5.4e+01	0.0e+00	9.8e-03	1.1e+01	2	0	5	16	5.5e+03	0.0e+00	1.0e+00	2.4e+00	0	0	0	3
2-Hexanone	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	4.4e-01	0	0	0	0
Tetrachloroethene	7.9e+02	0.0e+00	0.0e+00	2.0e-01	29	0	0	0	2.9e+05	0.0e+00	0.0e+00	5.5e-04	0	0	0	0
1,1,2,2-Tetrachloroethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Toluene	9.5e+02	2.4e-03	4.0e-04	7.2e-01	35	0	0	0	5.7e+06	1.5e+01	2.4e+00	7.7e-03	2	0	0	0
Chlorobenzene	3.1e+00	0.0e+00	0.0e+00	4.8e-02	0	0	0	0	2.8e+03	0.0e+00	0.0e+00	2.9e-04	0	0	0	0
Ethylbenzene	4.3e+02	1.3e-03	5.4e-04	1.1e-01	16	0	0	0	4.7e+06	1.4e+01	5.9e+00	1.8e-03	2	0	1	0
Styrene	1.2e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	4.3e+03	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Xylenes (mixed)	1.2e+02	8.0e-05	1.8e-04	1.5e-02	4	0	0	0	7.6e+04	5.3e+00	1.2e+01	9.1e-03	3	0	1	0
SEMIVOLATILES																
Phenol	4.7e-01	3.2e-03	7.5e-04	4.0e-03	0	0	0	0	4.0e+02	2.7e+00	6.4e-01	1.7e-02	0	0	0	0
bis(2-Chloroethyl) ether	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	5.0e+00	1.1e+00	1.8e-02	0	0	0	0
2-Chlorophenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,3-Dichlorobenzene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	1.8e-06	0	0	0	0
1,4-Dichlorobenzene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	5.9e-06	0	0	0	0
	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
			0.0e+00	3.7e-03	0	0	0	0	1.0e+03	0.0e+00	0.0e+00	1.9e-05	0	0	0	0
					0	0	0	0	2.4e+03	0.0e+00	2.5e+00	7.6e-05	0	0	0	0

TABLE 7-40
SELECTION OF CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN
ACS Site, Griffith, Indiana

Compound	Screening Based on Chemical Concentration and Toxicity: Importance Factor SS	SD	SW	GW	Percent of Total Importance SS	SD	SW	GW	Screening Based on Chemical Concentration and Chemistry: Importance Factor SS	SD	SW	GW	Percent of Total Importance SS	SD	SW	GW
bis(2-Chloroisopropyl)ether	0.0e+00	1.4e-01	7.3e-03	7.5e-02	0	3	4	0	0.0e+00	3.5e+01	1.8e+00	4.9e-03	0	0	0	0
4-Methylphenol	9.2e-01	5.4e-02	1.2e-01	4.4e-01	0	1	57	1	2.3e+03	1.4e+02	3.0e+02	4.4e-03	0	0	37	0
N-Nitroso-di-n-dipropylamine	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Hexachloroethane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Nitrobenzene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Isophorone	4.9e+00	0.0e+00	2.5e-04	1.8e-03	0	0	0	0	2.4e+03	0.0e+00	1.2e-01	1.4e-03	0	0	0	0
2-Nitrophenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2,4-Dimethylphenol	8.2e-01	6.0e-02	1.8e-03	1.8e-02	0	1	1	0	2.1e+02	1.5e+01	4.5e-01	2.6e-03	0	0	0	0
bis(2-Chloroethoxy)methane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2,4-Dichlorophenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
1,2,4-Trichlorobenzene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Naphthalene	2.4e+01	8.9e-02	0.0e+00	1.8e-02	1	2	0	0	6.3e+04	2.3e+02	0.0e+00	1.1e-04	0	0	0	0
4-Chloroaniline	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Hexachlorobutadiene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4-Chloro-3-methylphenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	9.4e-02	1.1e-04	0	0	0	0
2-Methylnaphthalene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	4.0e+04	2.4e+02	0.0e+00	3.8e-05	0	0	0	0
Hexachlorocyclopentadiene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2,4,6-Trichlorophenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2,4,5-Trichlorophenol	5.7e-03	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.5e+01	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2-Chloronaphthalene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2-Nitroaniline	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Dimethylphthalate	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	5.6e+01	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Acenaphthylene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
3-Nitroaniline	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Acenaphthene	2.0e-02	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.7e+03	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
2,4-Dinitrophenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4-Nitrophenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Dibenzofuran	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	3.5e+02	1.9e+02	0.0e+00	0.0e+00	0	0	0	0
2,4-Dinitrotoluene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Diethylphthalate	6.3e-02	0.0e+00	0.0e+00	1.1e-04	0	0	0	0	7.1e+02	0.0e+00	0.0e+00	6.3e-05	0	0	0	0
4-Chlorophenyl-phenylether	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Fluorene	5.2e-02	3.3e-02	0.0e+00	0.0e+00	0	1	0	0	4.5e+03	2.9e+01	0.0e+00	0.0e+00	0	0	0	0
4-Nitroaniline	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4,6-Dinitro-2-methylphenol	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
N-nitrosodiphenylamine	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	2.0e+03	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4-Bromophenyl-phenylether	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Hexachlorobenzene	0.0e+00	1.0e+00	0.0e+00	0.0e+00	0	34	0	0	0.0e+00	5.3e+02	0.0e+00	0.0e+00	0	0	0	0
Pentachlorophenol	5.0e-01	7.7e-02	0.0e+00	1.0e-03	0	2	0	0	8.0e+04	1.2e+04	0.0e+00	5.7e-08	0	0	0	0
Phenanthrene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	6.0e+04	5.3e+03	0.0e+00	0.0e+00	0	0	0	0
Anthracene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	9.2e+03	1.4e+03	0.0e+00	0.0e+00	0	0	0	0
Di-n-butylphthalate	9.4e+00	1.7e-02	0.0e+00	2.0e-04	0	0	0	0	1.6e+07	2.9e+04	0.0e+00	1.2e-08	7	0	0	0
Fluoranthene	2.8e-01	4.4e-02	0.0e+00	0.0e+00	0	1	0	0	1.3e+05	2.0e+04	0.0e+00	0.0e+00	0	0	0	0
Pyrene	2.6e-01	5.6e-02	0.0e+00	0.0e+00	0	1	0	0	8.7e+04	1.9e+04	0.0e+00	0.0e+00	0	0	0	0
Butylbenzylphthalate	2.6e+00	8.5e-03	0.0e+00	0.0e+00	0	0	0	0	1.2e+05	4.1e+02	0.0e+00	0.0e+00	0	0	0	0
[illegible]	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
[illegible]	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	3.3e+06	6.3e+05	0.0e+00	0.0e+00	1	8	0	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	0	2.6e+05	8.6e+04	0.0e+00	0.0e+00	0	1	0	0

TABLE 7-40
SELECTION OF CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN
ACS Site, Griffith, Indiana

	Screening Based on Chemical Concentration and Toxicity								Screening Based on Chemical Concentration and Chemistry							
	Importance Factor				Percent of Total Importance				Importance Factor				Percent of Total Importance			
Compound	SS	SD	SW	GW	SS	SD	SW	GW	SS	SD	SW	GW	SS	SD	SW	GW
bis(2-ethylhexyl)phthalate	2.7e+02	2.5e+00	0.0e+00	2.5e-02	10	52	0	0	3.7e+05	3.5e+03	0.0e+00	7.2e-05	0	0	0	0
di-n-octyl Phthalate	1.9e+01	0.0e+00	0.0e+00	0.0e+00	1	0	0	0	2.6e+04	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Benzo(b)fluoranthene(c)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	2.1e+06	3.6e+05	0.0e+00	0.0e+00	1	4	0	0
Benzo(k)fluoranthene(c)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	2.1e+06	3.5e+05	0.0e+00	0.0e+00	1	5	0	0
Benzo(a)pyrene(c)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	7.7e+06	2.3e+06	0.0e+00	0.0e+00	3	30	0	0
Idene(1,2,3-cd)pyrene(c)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.5e+06	5.2e+05	0.0e+00	0.0e+00	1	7	0	0
Dibenz(a,h)anthracene(c)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	8.9e+05	6.6e+05	0.0e+00	0.0e+00	0	9	0	0
Benzo(g,h,i)perylene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.8e+06	5.7e+05	0.0e+00	0.0e+00	1	7	0	0
Total-Carcinogenic PAHs	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
PESTICIDE/PCB																
alpha-BHC	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
beta-BHC	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
delta-BHC	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
gamma-BHC (Lindane)	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Heptachlor	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Aldrin	2.9e+01	0.0e+00	0.0e+00	0.0e+00	1	0	0	0	8.4e+03	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Heptachlor epoxide	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	5.9e+00	0.0e+00	0.0e+00	0	0	0	0
Endosulfan I	2.8e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.0e+05	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Dieldrin	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4,4'-DDE	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Endrin	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Endosulfan II	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4,4'-DDD	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.2e+05	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Endosulfan sulfate	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
4,4'-DDT	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Methoxychlor	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Endrin ketone	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
alpha-Chlordane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
gamma-Chlordane	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Toxaphene	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0
Total - PCBs	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0	1.7e+08	2.2e+06	4.5e+02	5.6e-08	76	28	55	0
	2712.48	4.88693	0.20695	65.9789	100	100	100	100	2.3e+08	7731889	807.668	99.3121	100	100	100	100
METALS																
Aluminum	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Antimony	2.1e+01	0.0e+00	0.0e+00	0.0e+00	23	0	0	0								
Arsenic	0.0e+00	0.0e+00	1.1e-02	1.1e-02	0	0	4	1								
Barium	8.2e+02	1.0e-02	4.6e-02	2.6e-01	9	14	16	25								
Beryllium	0.0e+00	0.0e+00	5.4e-04	5.0e-04	0	0	0	0								
Cadmium (food/soil)	4.4e+01	0.0e+00	1.8e-02	7.8e-02	48	0	6	7								
Chromium III	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Chromium VI	1.2e+03	1.8e-02	1.1e-02	1.6e-03	14	25	4	0								
	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
				0.0e+00	0	0	0	0								

TABLE 7-40
SELECTION OF CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN
ACS Site, Griffith, Indiana

	Screening Based on Chemical Concentration and Toxicity								Screening Based on Chemical Concentration and Chemistry							
	Importance Factor				Percent of Total Importance				Importance Factor				Percent of Total Importance			
Compound	SS	SD	SW	GW	SS	SD	SW	GW	SS	SD	SW	GW	SS	SD	SW	GW
Iron	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Lead	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Manganese	1.5e+02	0.0e+00	1.9e-01	4.3e-01	2	0	65	41								
Mercury	3.2e+02	4.1e-02	0.0e+00	5.7e-02	4	56	0	5								
Nickel	3.3e+01	3.4e-03	1.3e-02	0.8e-03	0	5	5	1								
Potassium	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Selenium	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Silver	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Sodium	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Thallium	0.0e+00	0.0e+00	0.0e+00	1.9e-01	0	0	0	18								
Vanadium	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Zinc	0.0e+00	0.0e+00	0.0e+00	0.0e+00	0	0	0	0								
Cyanide	6.6e+00	0.0e+00	0.0e+00	1.0e-03	0	0	0	0								
	9030.69	0.0726	0.28526	1.03519	100	100	100	100								

Notes:

1. The importance of each chemical was estimated using a screening procedure which utilized the chemical's concentration, and toxicity potential, or bioaccumulation and soil binding potential (organic chemicals only).

a. To assess the chemical's importance based on concentration and toxicity, the chemical's concentation was multiplied by the inverse of the species-specific reference dose (refer to Table 7-39 for data). The percentage of the total importance for each chemical within a given medium was calculated.

b. To assess each chemical's importance based on its bioaccumulation potential, the chemicals concentration (i.e., surface wate sediment, or surface soils) was multiplied by the chemical's Koc. The groundwater chemical concentration was multiplied by the inverse of the chemical's Koc, to assess the chemical's potential to be immobilized in the aquifer or subsurface wetland sediment and, therefore, not released to surface water.

An appropriate indicator of bioaccumulation or soil binding potential could not be located for many inorganic chemicals, in the available literature, therefore, screening for inorganics based on these characteristics could not be made.

[acs.2820]mike6.w20
MWK/mwk/JFK

TABLE 7-41

Potential Ecological Exposure Pathways
ACS Site, Griffith, Indiana

Potential Source (Environmental Medium)	Exposure Point	Route of Contaminant Uptake	Exposed Population	Exposure Potential
Surface water	Ditches	Surface absorption	Fish, algae, macrophytes, aquatic birds, macroinvertebrates, reptiles, amphibians	Low, little uptake of contaminants occurs by surface adsorption.
		Ingestion	Fish, aquatic birds, macro-invertebrates, reptiles, amphibians	High, some organics and metals bioaccumulate and biomagnify.
Surface water	Wetlands	Surface absorption	Macrophytes, algae, macroinvertebrates, aquatic birds, reptiles	Low, little uptake of contaminants occurs by surface adsorption.
Sediment	Ditches	Surface absorption	Macrophytes, macroinvertebrates	High, some organics and metals bioaccumulate and biomagnify.
		Ingestion	Fish, aquatic birds, macroinvertebrates	High, some organics and metals bioaccumulate and biomagnify.
Sediment	Wetlands	Surface absorption	Macrophytes, macroinvertebrates	High, some organics and metals bioaccumulate and biomagnify.
Biota	Ditches	Biomagnification	Fish, small mammals, reptiles, aquatic birds	High, some organics and metals bioaccumulate and biomagnify.
Biota	Wetlands	Biomagnification	Small mammals, birds	High, some organics and metals bioaccumulate and biomagnify.
Soil	Shallow soils	Surface absorption, ingestion	Burrowing mammals, reptiles	High, uptake may occur from incidental ingestion of soils.
Biota	Shallow soils	Biomagnification	Small mammals, birds, reptiles	High, some organics and metals bioaccumulate and biomagnify.

TABLE 7-42

Toxicological Endpoints for Representative Species of Concern
ACS Site, Griffith, Indiana

Exposure Route	Selected Species and Contaminant	Toxicological Endpoint	Test Species	Concentration (EE)	Reference
Ingestion of soil, water	*Terrestrial species* - burrowing rodent				
	2-butanone	Fetotoxicity	rat	4.6e+01 mg/kg-day	U.S. EPA, 1991
	toluene	Changes in liver and kidney weights	rat	2.2e+02 mg/kg-day	U.S. EPA, 1991
	4-methylphenol	Reduced body weight gain	rat	5.0e+01 mg/kg-day	U.S. EPA, 1991
	DEHP	Increased relative liver weight	guinea pig	1.9e+01 mg/kg-day	U.S. EPA, 1991
	Cadmium	Decreased survival	rat	3.9e-01 mg/kg-day	U.S. EPA, 1984
	Manganese	Reproductive effects	rat	5.2e+01 mg/kg-day	U.S. EPA, 1989
	Mercury	Kidney effects	rat	5.6e-01 mg/kg-day	U.S. EPA, 1991
Biomagnification from prey	Wetland species - mink				
	PCB	Onset of liver effects	mink	6.4e-01 mg/kg	Platonow and Karstad, 1973
Ingestion of sediment, water	Aquatic species - bluegill				
	2-butanone	Cell multiplication inhibition	bluegreen algae	1.1e+02 mg/L	Verschueren, 1983
	4-methylphenol	Onset of lethality (LD_0)	green algae	6.0e+00 mg/L	Verschueren, 1983
	DEHP	No effect on number of progeny	freshwater crustaceans	1.2e-01 mg/L	Dillon, 1984
	Manganese	Onset of mutation	*E. coli*	4.0e+02 mg/L	Sax, 1984
	Mercury	Spawning completely inhibited	minnow	1.0e-03 mg/L	Dillon, 1984

TABLE 7-43

Health Based Risk Estimates For Small Burrowing Rodents
ACS Site, Griffith, Indiana

Chemical	Concentration (mg/kg) (from Table 7-39)	Daily Intake (mg/kg/day) (from Table 7-44)	Reference Dose (mg/kg/day) (from Table 7-39)	Hazard Quo (unitles
Surface Soil				
Toluene	1.9e+04	5.7e+01	2.0e+01	2.8e+00
Cadmium	1.7e+02	5.2e-01	4.0e-02	1.3e+01
Total Risk				2e+01
Sediment				
DEHP	5.1e+00	1.5e-02	2.0e+00	7.5e-03
Mercury	1.2e-03	3.6e-06	3.0e-02	1.2e-04
Total Risk				8e-03
Plant Material				
Toluene	1.9e+04	---	2.0e+01	---
Cadmium	1.7e+02	7.6e-01	4.0e-02	1.9e+01
DEHP	5.1e+00	8.7e-03	2.0e+00	4.4e-03
Mercury	1.2e-03	2.7e-07	3.0e-02	9.0e-06
Total Risk				2e+01
Surface Water(1)				
2-Butanone	2.2e+00	2.2e-01	5.0e+00	4.4e-02
4-Methylphenol	5.9e-01	5.9e-02	5.0e+00	1.2e-02
Manganese	1.8e+00	1.8e-01	1.0e+01	1.8e-02
Total Risk				7e-02

Notes:

- The health risk estimates are calculated to represent the approximate risk to small burrowing mammals (e.g., mice, voles, rats, ground squirrels, woodchucks). The risk estimates are calculated based on rat toxicity information and daily food and water consumption rates.
- A hazard quotient greater than 1 indicates that exposure to the contaminan may cause deleterious health effects. Total risk hazard quotients are reporte to one significant figure (e.g., 2.8 + 13.1 = 20).

Footnote:

1. Surface water chemical concentrations are used to calculate health risks this medium unless the upper aquifer chemical concentration exceeds the surfa water chemical concentration by more than 100-fold. When this occurs (i.e.,

TABLE 7-43
(Continued)

butanone), the groundwater chemical concentration is divided by 100 and used to represent the surface water chemical concentration as a result of groundwater discharge to the wetland. The 100-fold factor represents a 10-fold biodegradation factor and 10-fold dilution factor.

Legend:

DEPH= Bis(2-ethylhexyl)phthalate

MWK/ccf/JFK
[mad-401-89b]
60251.17

TABLE 7-44

Calculation of Daily Intakes For Burrowing Mammals and Fish Body Burdens

Burrowing Mammals Daily Intakes(1)

Soil and Sediment-Ingestion

$$DI = \frac{CS \times IR \times CF \times FI}{BW}$$

DI = Daily Intake, mg/kg/day
CS = Soil or Sediment Chemical Concentration, mg/kg
IR = Soil or Sediment Ingestion Rate, 750 mg Soil or Sediment/day
CF = Conversion Factor, 10^{-6} kg/mg
FI = Fraction Ingested from Contaminated Area, 1 (i.e., 100%)
BW = Body Weight, 0.250 kg

Plant Material - Ingestion

$$DI = \frac{CS \times BAF \times IR_p \times CF \times FI}{BW}$$

DI = Daily Intake, mg/kg/day
CS = Soil or Sediment Chemical Concentration, mg/kg
BAF = Soil/Sediment to Plant Bioaccumulation factor, unitless
IR_p = Plant ingestion rate, 14,250 mg leafy or tuber/root material/day
CF = Conversion factor, 10^{-6} kg/mg
FI = Fraction Ingested from Contaminated Area, 1(i.e., 100%)
BW = Body Weight, 0.250 kg

Surface Water-Ingestion

$$DI = \frac{CW \times CR}{BW}$$

DI = Daily Intake, mg/kg/day
CW = Surface Water Chemical Concentration, mg/L
CR = Surface Water Consumption Rate, 0.025 L/day
BW = Body Weight, 0.250 kg

TABLE 7-44
(Continued)

Fish Body Burdens

Sediment-Ingestion

$$BB = \frac{CS \times IR \times BAF}{BW}$$

BB = Fish chemical body burden due to sediment ingestion, mg/kg
CS = Sediment chemical concentration, mg/kg
IR = Daily sediment consumption; 0.001 kg
BAF = Bioaccumulation factor, 0.5 (organics) or 0.1 (inorganics) based on professional judgment
BW = Body weight, 0.125 kg

Footnote:

1. The exposure factors (e.g., IR, BW, CR) were based on the size and feeding habits of an adult male rat. It was assumed that a rat diet consisted of 5% soil or sediment by weight (i.e., 750 mg soil or sediment). The average rat weighs 0.250 kg, and eats 15 grams food and drinks 25 ml of water per day.

2. The following are the soil/sediment to plant bioaccumulation factors (BAF) used to estimate plant concentrations of chemicals of potential concern. An average of the BAF for leafy vegetables and tubers was used to represent the BAF for plants ingested by burrowing mammals. Tubers were represented by available data on carrots and beets. Information on toluene's BAF was not located in the available literature.

Chemical	BAF Leaf Vegs.	BAF Tubers/Roots	Average BAF	Reference
Toluene	---	---	---	---
Cadmium	0.067	0.088	0.078	Dowdy and Larson, 1975
DEHP	0.035	0.026	0.030	Conner, 1984
Mercury	0.0065	0.0016	0.0040	Wiersma et. al, 1986

Note that data on PAH bioaccumulation was used to estimate the bioaccumulation potential of DEHP.

MWK/kml/JFK
[mad-400-C1a]
60251:17

TABLE 7-45

Predicted Food Source PCB Concentrations for Mink
and Related Health Risks
ACS Site, Griffith, Indiana

Food Source (Area)	Exposure Point[1] Concentration (mg/kg)	BAF	Proportion of Home Range	Fraction Contaminated	Predicted[2] Concentration in Food Source (mg/kg)
Small Game (Kapica-Pazmey)	3.3e+02	0.07	1/20	12/16	8.6e-01
Small Game (Wetlands)	4.0e+00	0.07	19/20	6/18	9.0e-02
Small Game (Home Range)					9.5e-01
Amphibians (Wetlands)	4.0e+00	0.22	19/20	6/18	2.8e-01
Amphibians (Home Range)					2.8e-01
Fish (Ditches)	4.6e-01	7	1	2/6	1.1e+00
Fish (Home Range)					1.1e+00
Crayfish (Ditches)	4.6e-01	5	1	2/6	7.7e-01
Fish (Home Range)					7.7e-01
Overall Diet - 1 (Home Range)[3]					2.9e-01
Overall Diet - 2 (Home Range)					6.8e-01
Permissible Diet Concentration					6.4e-01
Hazard Quotient (Diet-1)					1 [4]
Hazard Quotient (Diet-2)					1 [5]

Footnote:

(1) Exposure point concentrations represent the lesser of the 95% upperbound confidence limit of the mean or maximum concentration detected in a medium. Surface soil data was used to calculate the exposure point concentration for Kapica-Pazmey. Sediment samples collected in the wetlands and drainage ditches were used to calculate the exposure point concentration for wetlands. Surficial sediment samples collected in the drainage ditches were used to calculate the exposure point concentration for the ditches.

(2) The concentration of PCBs in a particular food source is estimated by the product of the exposure point concentration (i.e., wetlands sediment, Kapica-Pazmey surface soil or drainage ditch PCB concentration) x BAF x proportion of the total home range represented by the site area x the fraction of the area that is contaminated with PCBs. The contributions from each area are summed to arrive at an average home range concentration of PCBs in a specific food source (e.g., small game).

(3) Diet-1

For Diet-1, it was assumed that a mink ingests primarily small game (i.e., 90%) and amphibians (10%). The overall diet concentration of PCBs are estimated using the following equation and the home range food source concentrations listed above:

$$\text{Overall diet PCB concentration (mg/kg)} = \underset{(0.95 \times 0.9)}{\text{Small Game}} + \underset{(0.28 \times 0.1)}{\text{Amphibians}}$$
$$= 0.89$$

Diet-2

Using Agency assumptions, (i.e., Diet-2) a mink ingests primarily small game (40%), fish (25%), crayfish (25%), and amphibians (10%). The overall diet concentration of PCBs is estimated using the following equation and the home range food source concentrations listed above:

$$\text{Overall diet PCB concentrations} = \underset{(0.95 \times 0.4)}{\text{Small Game}} + \underset{(0.28 \times 0.1)}{\text{Amphibians}} + \underset{(1.1 \times 0.25)}{\text{Fish}} + \underset{(0.77 \times 0.25)}{\text{Crayfish}}$$
$$= 0.88$$

(4) Based on Platonow and Karstad (1973), the permissible tissue PCB concentration of a mink diet is 0.64 mg/kg. Assuming mink eat small game and amphibians, the predicted PCB concentration of the mink's diet (0.89 mg/kg) marginally exceeds this limit; therefore, there is a potential for PCB exposure to cause health effects in mink that potentially live in the contaminated area (i.e., HQ greater than 1)

(5) Based on Platonow and Karstad (1973), the permissible tissue PCB concentration of a mink diet is 0.64 mg/kg. The predicted concentration of the mink's diet (0.86 mg/kg) based on Agency assumptions produces a HQ=1.4. Therefore, there is a potential for PCB exposure to cause health effects in mink that potentially live in the contaminated area.

Legend

BAF - Bioaccumulation Factor

MWK/kml/JFK/DWH
[mad-401-89d]
60251.17

TABLE 7-46

Health Based Risk Estimates For Fish
ACS Site, Griffith, Indiana

Sediment

Chemical	Concentration (mg/kg) (from table 7-39)	Body Burden (1) (mg/kg)	Reference Dose (2) (mg/kg)	Hazard Quotie (unitless)
DEHP	5.1e+00	2.0e-02	5.8e+01	3.5e-05
Mercury	1.2e-03	9.6e-07	1.0e+01	9.4e-08
Total Risk				4.0e-05

Surface Water(3)

Chemical	Concentration (mg/L)	Exposure Point(1) Concentration (mg/L)	Reference Dose (mg/L)	Hazard Quotie (unitless)
2-Butanone	1.6e+00	1.6e+00	1.1e+02	1.4e-02
4-Methylphenol	5.9e-01	5.9e-01	4.0e+00	1.5e-01
Manganese	1.8e+00	1.8e-00	4.0e+02	4.5e-03
Total Risk				1.7e-01

Notes:

- The health risk estimates are calculated to represent the approximate risk to fish (e.g., bluegills and minnows). The risk estimates are calculated based on aquatic toxicity information and daily food and water consumption rates for bluegills.
- A hazard quotient greater than 1 indicates that exposure to the contaminant may cause deleterious health effects.

Footnotes:

1. To estimate the body burden of the chemical due to sediment ingestion, the chemical intake/day is multiplied by a bioaccumulation factor (i.e., 0.5 for organics, and 0.1 for inorganics; see Table 7-44 for an explanation). To estimate the exposure point concentration of fish to surface water, the actual or predicted (see footnote 3) surface water chemical concentration is used.

2. Reference doses (i.e., safe chemical body burdens) are estimated to assess the toxicity of ingested sediment. The safe water concentration of a chemical is multiplied by the chemical's BCF to calculate a safe body burden. The following are the safe water concentrations and BCF values used for the sediment contaminants of potential concern:

TABLE 7-46
(Continued)

Contaminant	Safe Water Concentration (mg/L)	BCF L/kg
DEHP	0.115	500
Mercury	0.001	10,000

To assess the toxicity of exposure from chemical uptake from water, a safe level of the chemical determined from bioassays with water alone is used to estimate the reference dose for surface water.

5. Surface water chemical concentrations measured during the RI are used to calculate health risks to this medium unless predicted surface water concentrations based on upper aquifer chemical concentrations exceeds the surface water chemical concentration measured. When this occurs (i.e., 2-butanone), the predicted surface water chemical concentrations are used to calculate health risk due to surface water exposure. Refer to Table 7-48 for a discussion of how predicted surface water concentrations were calculated.

Legend:

DEHP= Bis(2-ethylhexyl)phthalate

MWK/ccf/JFK
[mad-401-89e]
60251.17

TABLE 7-47

Toxicity Criteria for Selected Contaminants of Concern
ACS Site, Griffith, Indiana

Contaminant	Oral Chronic RDF (from U.S. EPA, 1991) Value(1)	Effect	Species	Rat Oral LD_{LO} (mg/kg) (from Sax, 1984)
2-butanone	5.0e+00 mg/kg-day	Fetotoxicity	rat	2.0e+03 (ipr-guinea pig)
DEHP	2.0e+00 mg/kg-day	Increased relative liver weight	guinea pig	3.5e+01
4-methylphenol	5.0e+00 mg/kg-day	Reduced body weight gain	rat	2.1e+02(LD_{50})
Toluene	2.0e+01 mg/kg-day	Changes in liver and kidney weight	rat	9.0e+03 (mouse)
PCB	-	-	-	9.0e+01
Cadmium	4.0e-02 mg/kg-day	Decreased survival	rat	4.5e+02 (mouse)
Manganese	1.0e+01 mg/kg-day	Reproductive effects	rat	1.0e+03
Mercury	3.0e-02 mg/kg-day	Kidney effects	rat	4.0e+02 (ipr)

(1) Factors for animal to human species and average to most sensitive individual have been removed.

JFK/kml/MWK
[mad-401-89f]

TABLE 7-48
COMPARISON OF AMBIENT WATER QUALITY CRITERIA TO PREDICTED SURFACE WATER CONCENTRATIONS
ACS Site, Griffith, Indiana

Compound	Upper Aquifer (mg/L)	Predicted Surface Water (mg/L)	Koc (ml/g)	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic
Chloromethane	6.80e-02	1.8e-04	3.50e+01				
Bromomethane		0.0e+00					
Vinyl chloride		1.3e-03	5.70e+01		1.9e+02		
Chloroethane	7.20e-01	1.7e-02	2.20e+00				
Methylene chloride	2.00e+00	2.2e-03	8.80e+00				
Acetone	3.80e-01	8.4e-01	2.20e+00				
Carbon disulfide	9.90e+01	0.0e+00	5.40e+01				
1,1-Dichloroethene		0.0e+00	6.50e+01				
1,1-Dichloroethene (cis)		6.9e-03	3.00e+01		1.4e+02		
1,2-Dichloroethene (trans)	2.40e+00	7.9e-04	4.90e+01				
1,2-Dichloroethene	4.00e-01	0.0e+00			2.9e+01	1.2e+00	
Chloroform		0.0e+00	3.10e+01		1.2e+02	2.0e+01	
1,2-Dichloroethane		0.0e+00	1.40e+01				
2-Butanone		0.0e+00	4.50e+00		5.3e+01		
1,1,1-Trichloroethane	2.20e+02	1.6e+00	1.52e+02				
Carbon tetrachloride		0.0e+00	1.10e+02				
Vinyl acetate		0.0e+00					
Bromodichloromethane		0.0e+00					
1,2-Dichloropropane		0.0e+00	5.10e+01		2.3e+01	5.7e+00	
cis-1,3-Dichloropropene		0.0e+00					
Trichloroethene		0.0e+00	1.26e+02		4.5e+01	2.2e+01	
Dibromochloromethane		4.0e-04					
1,1,2-Trichloroethane	4.50e-02	0.0e+00	5.40e+01		5.3e+00		
Benzene		0.0e+00	8.30e+01				
trans-1,3-Dichloropropene		1.3e-01					
Bromoform	1.00e+02	0.0e+00					
4-Methyl-2-pentanone		0.0e+00	2.05e+01				
2-Hexanone		2.0e-01	3.90e+00		5.3e+00	8.4e-01	
Tetrachloroethene	5.40e+01	1.4e-02	3.64e+02				
1,1,2,2-Tetrachloroethane	1.00e+00	4.5e-04	1.18e+02		1.8e+01		
Toluene	2.00e-01	0.0e+00	3.00e+02		2.0e+01		
Chlorobenzene		8.9e-03	3.38e+02		3.2e+01		
Ethylbenzene	2.30e+00	3.4e-04	1.10e+03				
Styrene	9.60e-02	1.2e-03	1.69e+02				
Xylenes (mixed)	1.10e+00	0.0e+00	3.38e+02				
	3.00e+00	1.1e-02					
SEMIVOLATILES							
Phenol		2.40e-01	1.1e-03	1.42e+01	1.0e+01	2.6e+00	
bis(2-Chloroethyl) ether		2.50e-01	1.2e-03	1.39e+01	2.4e+02		
2-Chlorophenol			0.0e+00	1.55e+01			
1,3-Dichlorobenzene		3.00e-03	2.1e-06	1.70e+03	1.1e+00	7.6e-01	
1,4-Dichlorobenzene		1.00e-02	7.1e-05	1.70e+03			
Benzyl Alcohol			0.0e+00	1.28e+01	1.1e+00	7.6e-01	
1,2-Dichlorobenzene		3.30e-02	2.3e-05	1.70e+03			
2-Methylphenol		3.80e-02	9.0e-05	5.00e+02			

TABLE 7-48
COMPARISON OF AMBIENT WATER QUALITY CRITERIA TO PREDICTED SURFACE WATER CONCENTRATIONS
ACS Site, Griffith, Indiana

Compound	Upper Aquifer (mg/L)	Predicted Surface Water (mg/L)	Koc (ml/g)	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic
bis(2-Chloroisopropyl)ether	3.00e-01	5.8e-04	6.10e+01				
4-Methylphenol	2.20e+00	5.2e-03	5.00e+02				
N-Nitroso-di-n-dipropylamine		0.0e+00					
Hexachloroethane		0.0e+00					
Nitrobenzene		0.0e+00					
Isophorone	3.50e-02	1.1e-04	2.49e+01	1.2e+02			
2-Nitrophenol		0.0e+00					
2,4-Dimethylphenol	1.10e-01	2.5e-04	4.20e+01	2.1e+00			
bis(2-Chloroethoxy)methane		0.0e+00					
2,4-Dichlorophenol		0.0e+00	3.80e+02				
1,2,4-Trichlorobenzene		0.0e+00	9.20e+03				
Naphthalene	7.10e-02	1.3e-04	6.49e+02	2.3e+00	6.2e-01		
4-Chloroaniline		0.0e+00					
Hexachlorobutadiene		0.0e+00	2.90e+04				
4-Chloro-3-methylphenol	5.00e-03	1.0e-05	4.70e+01	3.0e-02			
2-Methylnaphthalene	2.70e-02	4.5e-05	7.12e+02	1.7e+00	5.2e-01		
Hexachlorocyclopentadiene		0.0e+00					
2,4,6-Trichlorophenol		0.0e+00	2.00e+03				
2,4,5-Trichlorophenol		0.0e+00	8.90e+01				
2-Chloronaphthalene		0.0e+00	7.12e+02				
2-Nitroaniline		0.0e+00					
Dimethylphthalate		0.0e+00	4.03e+01				
Acenaphthylene		0.0e+00	2.50e+03				
3-Nitroaniline		0.0e+00					
Acenaphthene		0.0e+00	4.60e+03				
2,4-Dinitrophenol		0.0e+00					
4-Nitrophenol		0.0e+00	2.12e+01				
Dibenzofuran		0.0e+00	8.20e+02				
2,4-Dinitrotoluene		0.0e+00	4.50e+01				
Diethylphthalate	9.00e-03	7.1e-05	1.42e+02				
4-Chlorophenyl-phenylether		0.0e+00					
Fluorene		0.0e+00	7.30e+03				
4-Nitroaniline		0.0e+00					
4,6-Dinitro-2-methylphenol		0.0e+00					
N-nitrosodiphenylamine		0.0e+00	4.70e+02	5.9e+00			
4-Bromophenyl-phenylether		0.0e+00	8.20e+02				
Hexachlorobenzene		0.0e+00	3.90e+03				
Pentachlorophenol	3.00e-03	6.9e-08	5.30e+04	5.5e-02	3.2e-03		
Phenanthrene		0.0e+00	1.40e+04				
Anthracene		0.0e+00	1.40e+04				
Di-n-butylphthalate	2.00e-03	1.4e-08	1.70e+03	9.4e-01			
Fluoranthene		0.0e+00	3.80e+04	4.0e+00			
Pyrene		0.0e+00	3.80e+04				
Butylbenzylphthalate		0.0e+00	2.43e+03	3.3e+00	2.2e-01		
3,3'-Dichlorobenzidine		0.0e+00					
Benzo(a)anthracene(c)		0.0e+00	1.38e+05				
Chrysene(c)		0.0e+00	2.00e+05				

TABLE 7-48
COMPARISON OF AMBIENT WATER QUALITY CRITERIA TO PREDICTED SURFACE WATER CONCENTRATIONS
ACS Site, Griffith, Indiana

Compound	Upper Aquifer (mg/L)	Predicted Surface Water (mg/L)	Koc (ml/g)	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic
bis(2-ethylhexyl)phthalate	5.00e-02	8.6e-05	6.92e+02	4.0e-01	3.6e-01		
Di-n-octyl Phthalate		0.0e+00	6.92e+02				
Benzo(b)fluoranthene(c)		0.0e+00	5.50e+05				
Benzo(k)fluoranthene(c)		0.0e+00	5.50e+05				
Benzo(a)pyrene(c)		0.0e+00	5.50e+06				
Idene(1,2,3-cd)pyrene(c)		0.0e+00	1.60e+06				
Dibenz(a,h)anthracene(c)		0.0e+00	3.30e+06				
Benzo(g,h,i)perylene		0.0e+00	1.60e+06				
Total-Carcinogenic PANs		0.0e+00					
PESTICIDE/PCB							
alpha-BHC		0.0e+00	3.80e+03				
beta-BHC		0.0e+00	3.80e+03				
delta-BHC		0.0e+00					
gamma-BHC (Lindane)		0.0e+00	1.08e+03				
Heptachlor		0.0e+00					
Aldrin		0.0e+00	9.60e+04	3.0e-03			
Heptachlor epoxide		0.0e+00	2.20e+02	5.2e-04	3.8e-06		
Endosulfan I		0.0e+00	2.43e+04	2.2e-04	5.6e-05		
Dieldrin		0.0e+00					
4,4'-DDE		0.0e+00	4.40e+06				
Endrin		0.0e+00					
Endosulfan II		0.0e+00					
4,4'-DDD		0.0e+00	7.70e+05				
Endosulfan sulfate		0.0e+00					
4,4'-DDT		0.0e+00	2.43e+05				
Methoxychlor		0.0e+00					
Endrin ketone		0.0e+00	1.70e+03				
alpha-Chlordane		0.0e+00					
gamma-Chlordane		0.0e+00					
Toxaphene		0.0e+00					
Total - PCBs	2.96e-02	6.8e-08	5.30e+05	2.0e-03	1.4e-05		
METALS							
Aluminum	2.80e-01	5.6e-04					
Antimony		0.0e+00		9.0e+00	1.6e+00		
Arsenic	4.32e-02	8.6e-05		3.6e-01	1.9e-01		
Barium	1.84e+00	3.7e-03					
Beryllium	2.50e-04	5.0e-07		1.3e-01	5.3e-03		
Cadmium (water)	3.10e-03	6.2e-06		3.9e-03	1.1e-03		
Cadmium (food/soil)		0.0e+00					
Chromium III		0.0e+00					
Chromium VI	3.90e-03	7.8e-06		1.6e-02	1.1e-02		
Cobalt		0.0e+00					
Copper		0.0e+00		1.8e-02	1.2e-02		

TABLE 7-6B
COMPARISON OF AMBIENT WATER QUALITY CRITERIA TO PREDICTED SURFACE WATER CONCENTRATIONS
ACS Site, Griffith, Indiana

Compound	Upper Aquifer (mg/L)	Predicted Surface Water (mg/L)	Koc (ml/g)	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic
Lead	4.60e-03E	9.2e-06		8.2e-02	3.2e-03		
Manganese	4.25e+00	8.5e-03					
Mercury	1.70e-03	3.4e-06		2.4e-03	1.2e-05		
Nickel	5.30e-02	1.1e-04		1.8e+00	9.6e-02		
Potassium	9.58e+01	1.9e-01					
Selenium	6.20e-03	1.2e-05		2.6e-01	3.5e-02		
Silver		0.0e+00					
Sodium	4.44e+02	8.9e-01					
Thallium	4.00e-03	8.0e-06		1.4e+00	4.0e-01		
Vanadium	2.59e-02	5.2e-05					
Zinc	8.86e-01E	1.8e-03		3.2e-01	4.7e-02		
Cyanide	1.00e-02E	2.0e-05		2.2e-02	5.2e-03		

Notes:

- Ambient Water Quality Criteria (AWQC) are presented for both acute and chronic durations of exposure to contaminants. If AWQC are not presented it is because the U.S. EPA has not yet developed criteria for the chemical. An AWQC is the concentration of a chemical which should protect sensitive forms of aquatic life.

- Surface water chemical concentrations were predicted for the wetlands where there is the potential for contaminanted groundwater to discharge. Surface water chemical concentrations were predicted by dividing the groundwater chemical concentration by the chemical's retardation factor, a 10-fold biodegradation factor, and a 10-fold surface water dilution factor. The retardation factor was used to estimate the degree of dilution that would occur as the chemical passes through the aquifer and wetlands sediment. The biodegradation factor was applied only to those chemicals with Koc values less than 100 to account for their biodegradation potential. A surface water dilution factor was used to account for the dilution of contaminanted groundwater with clean surface water and groundwater discharged to the wetlands.

- The following is the equation used to calculate retardation factors for chemicals of potential concern:

  Retardation factor (unitless) = 1 + (soil bulk density/soil porosity) * Koc * foc

  Where the soil bulk density (1.9 g/cubic centimeter), and porosity (0.3) were used to represent aquifer and sediment conditions (refer to Section 6.2.1 and Table 6-2 of the RI report for more detailed, and specific estimates of these parameters). The chemical specific Koc is provided above. The average fraction of organic carbon (foc = 0.013) in sediment samples was used.

  Because inorganic analytes do not have Koc values, a retardation factor could not be calculated. Rather, a default soil-water distribution coefficient (i.e., 50) was used to account for metal retardation.

Legend:

E= Surface water concentration of contaminant exceeds the AWQC for the contaminant

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TABLE 7-49
SEDIMENT QUALITY CRITERIA AND HAZARD QUOTIENTS
AES Site, Griffith, Indiana

Compound	Sediment (mg/kg)	Surface Water (mg/L)	Koc-organics and Kd-inorganics	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic	Acute SQC mg/kg	Chronic SQC mg/kg	Acute HQ	Chronic HQ	SQC Exceedance Acute	SQC Exceedance Chronic
Chloromethane			3.50e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Bromomethane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Vinyl chloride			5.70e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Chloroethane	1.16e-02	3.00e-02	2.20e+00					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Methylene chloride	2.58e-02		8.80e+00	1.9e+02				2.2e+01	0.0e+00	1.2e-03	0.0e+00		
Acetone		3.80e-01	2.20e+00					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Carbon disulfide			5.40e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,1-Dichloroethene			6.50e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,1-Dichloroethane		2.00e-03	3.00e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,2-Dichloroethene (cis)	5.60e-03	3.00e-03	4.90e+01	1.4e+02				8.6e+01	0.0e+00	6.5e-05	0.0e+00		
1,2-Dichloroethene (trans)								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Chloroform	5.93e-03		3.10e+01	2.9e+01	1.2e+00			1.2e+01	5.0e-01	5.1e-04	1.2e-02		
1,2-Dichloroethane			1.40e+01	1.2e+02	2.0e+01			2.1e+01	3.6e+00	0.0e+00	0.0e+00		
2-Butanone	8.86e-03	1.40e-01	4.50e+00					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,1,1-Trichloroethane	3.00e-03		1.52e+02	5.3e+01				1.0e+02	0.0e+00	2.9e-05	0.0e+00		
Carbon tetrachloride			1.10e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Vinyl acetate								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Bromodichloromethane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,2-Dichloropropane			5.10e+01	2.3e+01	5.7e+00			1.5e+01	3.8e+00	0.0e+00	0.0e+00		
cis-1,3-Dichloropropene								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Trichloroethene			1.26e+02	4.5e+01	2.2e+01			7.4e+01	3.6e+01	0.0e+00	0.0e+00		
Dibromochloromethane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,1,2-Trichloroethane			5.60e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Benzene	4.30e-01	4.60e-01	8.30e+01	5.3e+00				5.7e+00	0.0e+00	7.5e-02	0.0e+00		
trans-1,3-Dichloropropene								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Bromoform								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4-Methyl-2-pentanone		4.90e-02	2.05e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2-Hexanone			3.90e+00					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Tetrachloroethene			3.64e+02	5.3e+00	8.4e-01			2.5e+01	4.0e+00	0.0e+00	0.0e+00		
1,1,2,2-Tetrachloroethane			1.18e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Toluene	4.89e-02	6.00e-03	3.00e+02	1.8e+01				6.8e+01	0.0e+00	7.2e-04	0.0e+00		
Chlorobenzene			3.30e+02	2.8e+01				8.4e+01	0.0e+00	0.0e+00	0.0e+00		
Ethylbenzene	1.31e-02	5.40e-03	1.10e+03	3.2e+01				4.6e+02	0.0e+00	2.9e-05	0.0e+00		
Styrene			1.89e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Xylenes (mixed)	1.60e-02	3.50e-02	3.39e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
SEMIVOLATILES													
Phenol	1.90e-01	4.50e-02	1.42e+01	1.0e+01	2.6e+00			1.9e+00	4.7e-01	1.0e-01	4.0e-01		
bis(2-Chloroethyl) ether	3.61e-01	7.70e-02	1.39e+01	2.4e+02				4.3e+01	0.0e+00	8.4e-03	0.0e+00		
2-Chlorophenol			1.55e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,3-Dichlorobenzene			1.70e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,4-Dichlorobenzene			1.70e+03	1.1e+00	7.6e-01			2.5e+01	1.7e+01	0.0e+00	0.0e+00		

TABLE 7-49
SEDIMENT QUALITY CRITERIA AND HAZARD QUOTIENTS
ACS Site, Griffith, Indiana

Compound	Sediment (mg/kg)	Surface Water (mg/L)	Koc-organics and Kd-Inorganics	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic	Acute SOC mg/kg	Chronic SOC mg/kg	Acute HQ	Chronic HQ	SOC Exceedance Acute	SOC Exceedance Chronic
Benzyl Alcohol			1.20e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,2-Dichlorobenzene			1.70e+03	1.1e+00	7.6e-01			2.5e+01	1.7e+01	0.0e+00	0.0e+00		
2-Methylphenol		5.00e-03	5.00e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
bis(2-Chloroisopropyl)ether	5.77e-01	2.90e-02	6.10e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4-Methylphenol	2.70e-01	5.90e-01	5.00e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
N-Nitroso-di-n-dipropylamine								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Hexachloroethane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Nitrobenzene								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Isophorone		5.00e-03	2.49e+01	1.2e+02				3.8e+01	0.0e+00	0.0e+00	0.0e+00		
2-Nitrophenol								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2,4-Dimethylphenol	3.62e-01	1.00e-02	4.20e+01	2.1e+00				1.2e+00	0.0e+00	3.1e-01	0.0e+00		
bis(2-Chloroethoxy)methane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2,4-Dichlorophenol			3.80e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
1,2,4-Trichlorobenzene			9.20e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Naphthalene	3.57e-01		6.49e+02	2.3e+00	6.2e-01			1.9e+01	5.2e+00	1.8e-02	6.8e-02		
4-Chloroaniline								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Hexachlorobutadiene			2.90e+04					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4-Chloro-3-methylphenol		2.00e-03	4.70e+01	3.0e-02				1.8e-02	0.0e+00	0.0e+00	0.0e+00		
2-Methylnaphthalene	3.41e-01		7.12e+02	1.7e+00	5.2e-01			1.6e+01	4.8e+00	2.2e-02	7.1e-02		
Hexachlorocyclopentadiene								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2,4,6-Trichlorophenol			2.00e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2,4,5-Trichlorophenol			8.90e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2-Chloronaphthalene			7.12e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2-Nitroaniline								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Dimethylphthalate			4.03e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Acenaphthylene			2.50e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
3-Nitroaniline								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Acenaphthene			4.60e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2,4-Dinitrophenol								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4-Nitrophenol			2.12e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Dibenzofuran	2.30e-01		8.20e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
2,4-Dinitrotoluene			4.50e+01					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Diethylphthalate			1.42e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4-Chlorophenyl-phenylether								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Fluorene	3.95e-01		7.30e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4-Nitroaniline								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4,6-Dinitro-2-methylphenol								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
N-nitrosodiphenylamine			4.70e+02	5.9e+00				3.6e+01	0.0e+00	0.0e+00	0.0e+00		
4-Bromophenyl-phenylether			6.20e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Hexachlorobenzene	1.40e-01		3.90e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Pentachlorophenol	2.30e-01		5.30e+04	2.0e-02	1.3e-02			1.4e+01	9.0e+00	1.7e-02	2.6e-02		
Phenanthrene	3.77e-01		1.40e+04					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Anthracene	1.00e-01		1.40e+04					0.0e+00	0.0e+00	0.0e+00	0.0e+00		

TABLE 7-49
SEDIMENT QUALITY CRITERIA AND HAZARD QUOTIENTS
ACS Site, Griffith, Indiana

Compound	Sediment (mg/kg)	Surface Water (mg/L)	Koc-organics and Kd-inorganics	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedence Acute	AWQC Exceedence Chronic	Acute SQC mg/kg	Chronic SQC mg/kg	Acute HQ	Chronic HQ	SQC Exceedence Acute	SQC Exceedence Chronic
Bi-n-butylphthalate	1.70e-01		1.70e+05	9.4e-01				2.1e+03	0.0e+00	8.2e-05	0.0e+00		
Fluoranthene	5.24e-01		3.80e+04	4.0e+00				2.0e+03	0.0e+00	2.7e-04	0.0e+00		
Pyrene	5.00e-01		3.80e+04					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Butylbenzylphthalate	1.70e-01		2.43e+03	3.3e+00	2.2e-01			1.8e+02	6.9e+00	1.6e-03	2.4e-02		
3,3'-Dichlorobenzidine								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Benzo(a)anthracene(c)	4.57e-01		1.38e+06					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Chrysene(c)	4.29e-01		2.00e+05					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
bis(2-ethylhexyl)phthalate	5.07e+00		6.92e+02	4.0e-01	3.6e-01			1.6e+00	1.2e+00	1.4e+00	1.4e+00	E	E
Di-n-octyl Phthalate			6.92e+02					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Benzo(b)fluoranthene(c)	6.24e-01		5.50e+05					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Benzo(k)fluoranthene(c)	6.34e-01		5.50e+05					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Benzo(a)pyrene(c)	4.18e-01		5.50e+06					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Idono(1,2,3-cd)pyrene(c)	3.24e-01		1.68e+06					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Dibenz(a,h)anthracene(c)	2.08e-01		3.38e+06					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Benzo(g,h,i)perylene	3.59e-01		1.68e+06					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Total-Carcinogenic PAHs	3.09e+00							0.0e+00	0.0e+00	0.0e+00	0.0e+00		
PESTICIDE/PCB													
alpha-BHC			3.80e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
beta-BHC			3.80e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
delta-BHC								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
gamma-BHC (Lindane)			1.08e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Heptachlor								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Aldrin			9.60e+04	3.0e-03				3.7e+00	0.0e+00	0.0e+00	0.0e+00		
Heptachlor epoxide	2.66e-02		2.20e+02	5.2e-04	3.8e-06			1.5e-03	1.1e-05	1.8e+01	2.4e+03	E	E
Endosulfan I			2.43e+06	2.2e-04	5.6e-05			4.9e+00	1.8e+00	0.0e+00	0.0e+00		
Dieldrin								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4,4'-DDE			4.40e+06					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Endrin								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Endosulfan II								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4,4'-DDD			7.70e+05					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Endosulfan sulfate								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
4,4'-DDT			2.43e+05					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Methoxychlor								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Endrin ketone			1.70e+03					0.0e+00	0.0e+00	0.0e+00	0.0e+00		
alpha-Chlordane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
gamma-Chlordane								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Toxaphene								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Total - PCBs	4.11e+00	8.40e-04	5.30e+05	2.0e-03	1.4e-05		E	1.4e+01	9.6e-02	3.0e-01	4.3e+01		E
METALS													

TABLE 7-49
SEDIMENT QUALITY CRITERIA AND HAZARD QUOTIENTS
ACS Site, Griffith, Indiana

Compound	Sediment (mg/kg)	Surface Water (mg/L)	Koc-organics and Kd-Inorganics	Acute AWQC (mg/L)	Chronic AWQC (mg/L)	AWQC Exceedance Acute	AWQC Exceedance Chronic	Acute SQC mg/kg	Chronic SQC mg/kg	Acute HQ	Chronic HQ	SQC Exceedance Acute	SQC Exceedance Chronic
Aluminum		9.60e-01											
Antimony				9.0e+00	1.6e+00			0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Arsenic		4.50e-02	2.5e+02	3.6e-01	1.9e-01			8.9e+01	4.7e+01	0.0e+00	0.0e+00		
Barium	7.12e-02	3.22e-01						0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Beryllium		2.69e-04		1.3e-01	5.3e-03			0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Cadmium (water)		7.20e-04	4.1e+02	3.9e-03	1.1e-03			1.6e+00	4.5e-01	0.0e+00	0.0e+00		
Cadmium (food/soil)								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Chromium III								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Chromium VI	4.54e-02	2.80e-02		1.6e-02	1.1e-02	E	E	0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Cobalt								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Copper	9.44e-02	1.90e-02	5.1e+03	1.8e-02	1.2e-02	E	E	9.2e+01	6.2e+01	1.0e-03	1.5e-03		
Iron		1.43e+01			1.0e+00		E	0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Lead		2.38e-02	2.3e+03	8.2e-02	3.2e-03		E	1.9e+02	7.3e+00	0.0e+00	0.0e+00		
Manganese		1.85e+00						0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Mercury	1.22e-03		8.7e+01	2.4e-03	1.2e-03			2.1e-01	1.0e-03	5.9e-03	1.2e+00		E
Nickel	2.04e-02	8.00e-02		1.4e+00	1.6e-01			0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Potassium		3.00e+01						0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Selenium	5.73e-04	1.83e-03		2.6e-01	3.5e-02			0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Silver								0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Sodium		8.23e+01						0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Thallium				1.4e+00	4.0e-01			0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Vanadium	3.45e-02							0.0e+00	0.0e+00	0.0e+00	0.0e+00		
Zinc		8.80e-02	2.5e+03	3.2e-01	4.7e-02		E	7.9e+02	1.2e+02	0.0e+00	0.0e+00		
Cyanide				2.2e-02	5.2e-03			0.0e+00	0.0e+00	0.0e+00	0.0e+00		

Notes:

- The Sediment Quality Criteria (SQC) for organic compounds are calculated by multiplying the Ambient Water Quality Criteria (AWQC) by the compound's soil-water partition coefficients (Koc) and the percent total organic carbon (% TOC) in sediment (i.e., 0.013 or 1.3%).
- AWQC and SQC are presented for both acute and chronic durations of exposure to contaminants. If AWQC are not presented it is because the U.S. EPA has not yet developed criteria for the chemical. An AWQC is the concentration of a chemical which should protect sensitive forms of aquatic life.
- Hazard Quotients (HQ) are developed for both acute and chronic durations of exposure to surface water or sediment. A HQ of greater than 1 indicates the sediment concentration may pose a health threat to aquatic life.
- SQC for six metals are developed by multiplying AWQC by metal distribution coefficients obtained from the literature (Chapman, 1989). The % TOC of 1.3 % is substituted in Chapman's calculations for development of Kd values for the ACS Site. The following are Chapman's linear regression equations for specific metals.

TABLE 7-49
SEDIMENT QUALITY CRITERIA AND HAZARD QUOTIENTS
ACS Site, Griffith, Indiana

Arsenic: log Kd = -0.05 (%TOC) + 2.46
Cadmium: log Kd = 0.21 (%TOC) + 2.34
Copper: log Kd = 0.33 (%TOC) + 3.28
Lead: log Kd = 0.20 (%TOC) + 3.10
Mercury: log Kd = 0.05 (%TOC) + 1.87
Zinc: log Kd = 0.074 (%TOC) + 3.29

Legend:

E= Surface water or sediment concentration of contaminant exceeds the AWQC for the contaminant
HQ= Hazard Quotient

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6-21-91

TABLE 7-50

Calculation of Hardness-Corrected
Ambient Water Quality Criteria
ACS MPL Site
Griffith, Indiana

			Hardness Calculation[1]			AWQC Values[2]	
Metal	Sample	Conc. (ug/L)	Ca (mg/L)	Mg (mg/L)	Hardness (mg/L)	Acute (ug/L)	Chronic (ug/L)
Cd	MW04-01	3.1	183	31.5	587	28.9	4.6
Cr	SW5	28	334	61.7	1090	12300	1460
Cu	SW02	22	12.5	1.1	35.7	6.70	4.9
Pb	SW02	23.8	12.5	1.1	35.7	22.0	0.9
Pb	SW08	16.2	15.2	4.3	55.7	38.7	1.5
Pb	SW01	6.3	78.3	34.8	339	386.0	15.0
Pb	SW07A	4.6	128	25.1	423	512.0	20.0
Pb	SW05	4.2	334	61.7	1090	1700	66.4
Pb	MW15-01	4.6	35.9	57.4	326	367	14.3
Zn	SW08	88	15.2	4.3	55.7	71.2	64.5
Zn	SW02	61	12.5	1.1	35.7	48.9	44.3
Zn	MW03-01	343	218	21.1	631	557	505
Zn	MW04-01	510	183	31.5	587	524	475
Zn	MW05-01	174	202	32	636	561	508
Zn	MW06-01	886	185	31.4	591	527	478

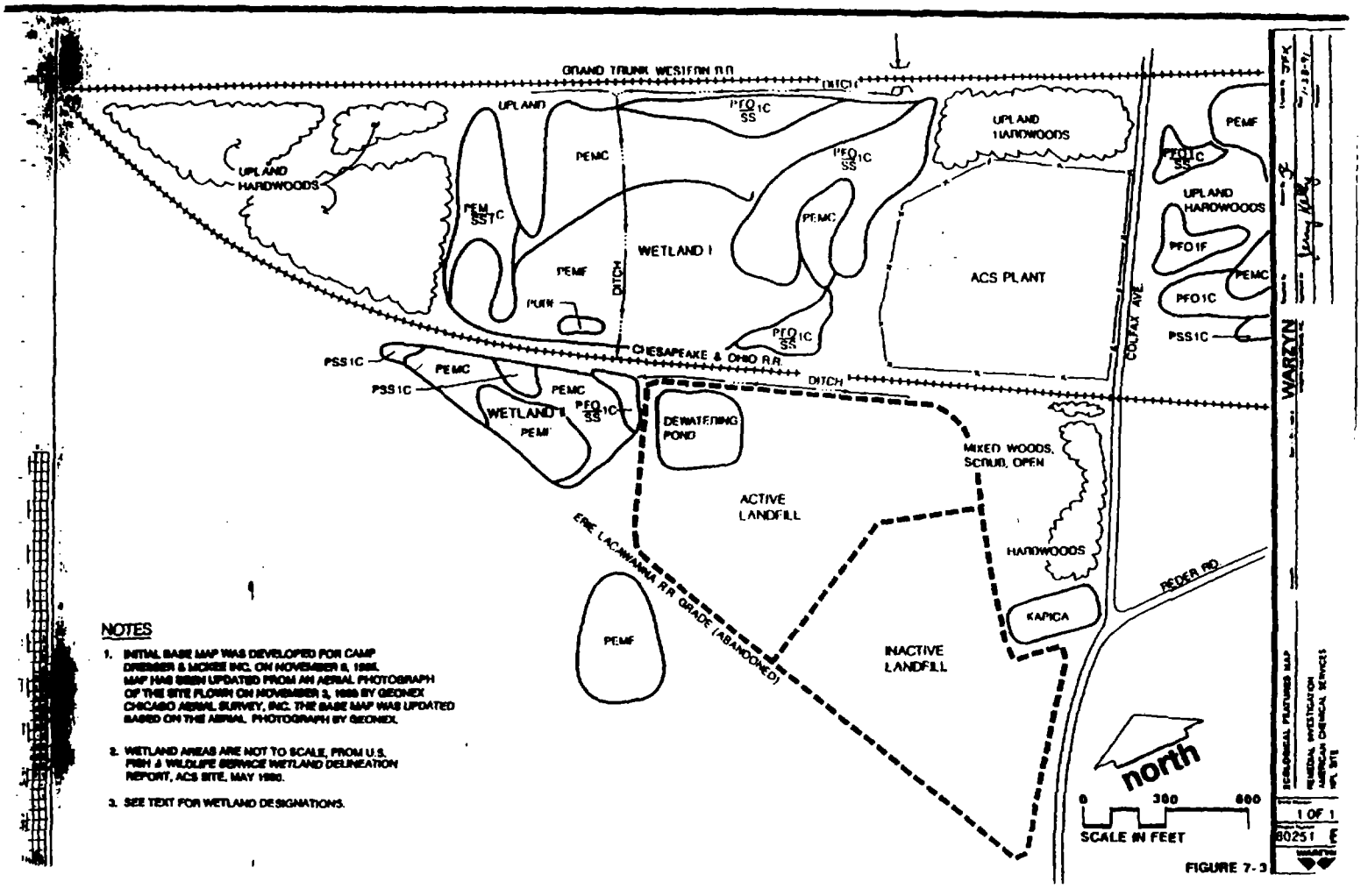
Footnotes:

1. Hardness is calculated as follows: 2.497 [Ca] + 4.118 [Mg] = Hardness where all concentrations are in mg/L.

2. Ambient Water Quality Criteria (AWQC) values are calculated for each metal using the calculated hardness at each sample location and the following metal specific equations for acute and chronic AWQC. Dates given indicate publication dates of the equations by the U.S. EPA.

Metal	Acute Criterion Equation	Chronic Criterion Equation
Cadmium (12/3/86)	$e^{(1.128[\ln(\text{hardness})]-3.828)}$	$e^{(0.7852[\ln(\text{hardness})]-3.490)}$
Chromium (Trivalent) (12/3/86)	$e^{(0.8190[\ln(\text{hardness})]+3.688)}$	$e^{(0.8190[\ln(\text{hardness})]+1.561)}$
Copper (12/3/86)	$e^{(0.9422[\ln(\text{hardness})]-1.464)}$	$e^{(0.8545[\ln(\text{hardness})-1.465)}$
Lead (12/3/86)	$e^{(1.273[\ln(\text{hardness})]-1.460)}$	$e^{(1.273[\ln(\text{hardness})-4.705)}$
Nickel (12/3/86)	$e^{(0.8460[\ln(\text{hardness})]+3.3612)}$	$e^{(0.8460[\ln(\text{hardness})]+1.1645)}$
Zinc (3/2/87)	$e^{(0.8473[\ln(\text{hardness})]+0.8604)}$	$e^{(0.8473[\ln(\text{hardness})]+0.7614)}$

JFK/kml/JAH
[mad-401-89h]
60251.17



NOTES

1. INITIAL BASE MAP WAS DEVELOPED FOR CAMP DRESSER & MCKEE INC. ON NOVEMBER 8, 1985. MAP HAS BEEN UPDATED FROM AN AERIAL PHOTOGRAPH OF THE SITE FLOWN ON NOVEMBER 3, 1988 BY GEONEX CHICAGO AERIAL SURVEY, INC. THE BASE MAP WAS UPDATED BASED ON THE AERIAL PHOTOGRAPH BY GEONEX.

2. WETLAND AREAS ARE NOT TO SCALE, FROM U.S. FISH & WILDLIFE SERVICE WETLAND DELINEATION REPORT, ACS SITE, MAY 1990.

3. SEE TEXT FOR WETLAND DESIGNATIONS.

FIGURE 7-3

Coffield Ungaretti & Harris

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April 20, 1992

VIA MESSENGER

Steve C. Mason, Esq.
Assistant Regional Counsel
United States Environmental Protection Agency
111 West Jackson Boulevard -- 3d Floor
Chicago, Illinois 60604

Re: American Chemical Service; Administrative Order by Consent No. VW-88-C-113
Our File #10615-00001

Dear Mr. Mason:

This letter is intended to preserve the rights of Respondents under the above Consent Decree. We take issue with the summary of events relating to the Ecological Assessment as set forth in your April 15, 1992 correspondence. You state that Respondents failed to invoke dispute resolution, yet until your April 15, 1992 transmittal, received April 20th, there was no action by EPA for which Respondents could invoke dispute resolution.

You correctly observe that EPA received Respondent's revised version of the Ecological Assessment on October 8, 1991. We believe that version fully meets the requirements of the Consent Decree and NCP. Until your letter of April 15, 1992, no formal notification was provided by EPA in response to that submittal as to what action(s) would be required, if any, of Respondents or what EPA intended to do. To be sure, options were discussed among our respective technical representatives. Indeed, we were lead to believe EPA's chosen course would be to provide to Respondents "detailed comments" in the form of an Ecological Assessment draft, which the Respondents could then accept (or, presumably, reject and invoke dispute resolution).

This is not to say that the Respondents reject what EPA has done, or that your Ecological Assessment is necessarily unacceptable; rather, we wish to advise immediately that we

EXHIBIT
I

are reviewing EPA's Ecological Assessment. If all or a portion of it is unacceptable to Respondents, you will be hearing from us, pursuant to the terms of the Consent Order.

Very truly yours,

Andrew H. Perellis

AHP:cc
ahp0782

cc: Steve Siegel
ACS Steering Committee Members
ACS Technical Subcommittee Members
Jennifer Nijman